Elliott Jaques and Sensemaking: Ultimate Sensemaker or 20th Century Relic?

by

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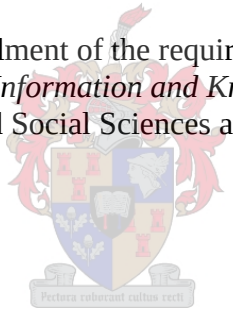

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Opsomming

Die tesis oorweeg die werk van Elliot Jacques deur die lens van die onlangste interpretatiewe sienings van organisasie en bestuursteorie. Op die oomblik vorm Jacques nie deel van die hoofstroom bestuursdenke nie. Hy is hoofsaaklik bekend vir Gestratifiseerde Sisteemteorie deur sy boek *Requisite Organization*. Alhoewel hierdie teorie baie invloedryk was, word dit meestal gesien as deel van bestuursgeskiedenis en wat eerder as kontroversieel as relevant beskou word. Hierdie oordeel is gewoonlik gebaseer op sy hoofwerk – *Requisite Organization*. Sy navorsing is egter op vyftig jaar in bestuurswetenskap gebaseer en die tesis bekyk sy totale bydrae in 'n poging om die navorsing waarop *Requisite Organization* gebaseer is te probeer verstaan. Dit verduidelik Jacques se afwyking van huidige determinismes wat ons huidige verstaan domineer en haak sy werk in *Levels of Abstraction in Logic and Human Action* met Maturana en Varella se konsep van autopoiesis en sy totale bydrae met Weick se teorie van Organisatoriese Singewing. Daar word aangedui hoedat die wortels van *Requisite Organization* dieselfde sake probeer aanspreek as Organisatoriese Singewing. Ten slotte word verskeie aspekte van Jacques se werk in verband gebring met aspekte van Weick se werk wat met die eerste oogopslag teenstrydig skyn te wees. Daar word geargumenteer dat, gesien as 'n geheel, Jacques se teorie baie meer modern voorkom as voorheen aanvaar is.

Summary

The thesis considers the work of Elliot Jaques through the most recent interpretivist views of organizations and management. As it stands, Jacques does not form part of mainstream management thinking. Jacques is primarily known in organization and management theory for Stratified Systems Theory through his book *Requisite Organization*. Although undoubtedly influential, his views are generally considered to be either outdated or highly contentious. This assessment is mostly based on his book *Requisite Organization*. However, Jaques' work spans fifty years of research in management science and the thesis explores his entire body of work with a view to understanding the research that *Requisite Organization* is founded upon. It explains Jaques' divergence from the current determinisms that dominate our current milieu and links his work in *Levels of Abstraction in Logic and Human Action* with Maturana and Varella's concept of autopoiesis and Weick's theory of Organizational Sensemaking. It is shown how the roots of *Requisite Organization* seeks to address similar concerns to that of Organizational Sensemaking. In conclusion various aspects of Jacques work are mapped to aspects of Weick's work, which at first glance would have seemed incompatible. It is argued that, if considered as a whole, Jacques' theory resonates with much more modern understandings of organization and management theory than is widely assumed.

Acknowledgements

I would like to thank my wife for her enduring patience with me, not only in the writing of this thesis, but also in all of our lives together. Her forbearance and fortitude have bordered on the angelic.

C S Lewis once wrote “We read to know we are not alone.” As a schoolboy reading the short extracts from the classics presented as “comprehension” exercises, my curiosity had always lead me to read the books as well, and I spent many wonderful hours in worlds, not only great distances away, but centuries as well. Even more fascinating is that this wonderful transport mechanism was created by placing symbols on pages, which became meaningful through my imaginations and visions. I wish to acknowledge the contribution of all those who have taken the trouble to write books of all types. Without them parts of my life would have been empty.

In my pursuit of this degree the first question I asked was that if, with the advent of ITC technology and the information overload we experience as a result thereof, it was not time to consider a new alphabet. After a long literary journey, my reading led me back to sense-making, Karl Weick and ultimately Elliott Jaques. I still can’t answer the first question, but I offer you this thesis as an appetizer of what would lie in store in the pursuit of such a quest.

I would also like to acknowledge the role played by the Centre for Knowledge Dynamics and Decision-Making staff of Stellenbosch University. Their efforts in exposing me to new thoughts and ideas have set me on a new direction and brought me closer to my own unified vista of God and humankind in His universe.

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Chapter 1
Introduction

"It is utopian to think we can carry on as we are"
Elliott Jaques

This thesis is unashamedly about Elliott Jaques and his life's work. It has not been an easy task deciding which parts of Jaques work to emphasize and which gloss over, but it certainly has been an interesting one.

As the title suggests, Jaques' theories are based on the applicability of hierarchies in modern organizations, and as such, could very easily be dismissed as being a relic of the 20th century. My purpose is to look behind the facade of Jaques' better known work, *Requisite Organization*, which is the thrust of Jaques' discoveries and theories into the community at large. The book in focus is written differently, almost idiosyncratically, in that the paging is done in "pairs," there are almost no references and very little justification offered for the contents presented. When I looked behind the edifice and explored the world it obscures, I could not help but be amazed at what I found. Hopefully I will be able to impart a little of what is there to the reader.

1.1 Elliot Jaques

Elliott Jaques' research and writing has spanned more than fifty years and generated a significant amount of interest, but interestingly enough not in the mainstream of management science and decision theory. To wit, Kenneth Cradock in his "*Requisite Organization - Annotated Bibliography Fifth Edition - August 2009*"[1] has compiled a bibliography containing some 6 927 entries[2] of the known research done by Jaques, his associates with him and all other research in which Jaques is directly referred to or quoted from. He explained his methodology in compiling the bibliography as based on the following bibliographies:

1. Cason Hall & Company compiled by Alison Brause[3],

[1] (Craddock, 2009)
[2] Ibid p 53
[3] See Appendix A.

2. the Ph.D. dissertations on the theory,
3. other books, chapters and journal articles written about the theory, and
4. general literature on management and organization,"[4]

He listed a total of 4 074 published academic studies, of which 1506 were published in peer review journals, with 473 of the above mentioned in A-level or first tier journals. The academic disciplines addressed in these publications ranged from Economics, Management (and Organizations), Labor Economics, Operations/ Decision Analysis/ Information Systems, Psychology, Sociology and a variety of other miscellaneous disciplines. Craddock maintains that not all these were beneficial to the dissemination of Jaques' Requisite Organization theory as some tried to bridge Requisite Organization and other concepts and so diluted the effectiveness promised by Jaques. Thelejane[5] describes how his enquieries to global corporations known to make use of *Requisite Organization* in their management structures were politely declined.

The question then arises as to why does Jaques' Requisite Organization and research attract so much attention, under the radar as it were, and yet he is largely ignored in current mainstream management theory?

This thesis is about Elliot Jaques and his work as a sensemaker and how he fits into the world of sense making. It is written in the form of a narrative enquiry[6] in which I not only tell the reader of Jaques' work and discoveries, but also examine and interpret the meaning Jaques intended as viewed through a sensemaking lens. Where appropriate I refer and compare Jaques' ideas and concepts to those of Weick and others. My bias is evident in the use of the first person to write this thesis. I do this in deference to Micheal Polyani and his claim that absolute objectivity is impossible[7]; I have read too much of Elliott Jaques not to have at least some Jaquian bias.

I also make extensive use of direct quotations from Jaques' various book, partly due to the fact that I could not say it better and that a lot of the meaning of what is written would be lost by my paraphrasing, and also partly to stimulate the reader into seeking out Jaques' writings and reading them for themselves.

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[4] Ibid p 54

[5] (Thelejane, 2010)

[6] Narrative Inquiry is a fairly recent movement in social science qualitative research. It has been employed as a tool for analysis in the fields of cognitive science, organizational studies, knowledge theory, sociology and education studies, among others. Of interest to narrative inquirers is not what happened so much as what meaning did people make of what happened. (wikipedia.org/wiki/Narrative_inquiry)

[7] (Polyani, 1958)

1.2 The Discoveries

Craddock maintains that there were six important discoveries that set this theory apart from most during the last 50 years of mainstream research on organizations. He cites the development of these discoveries :

1. "social analysis" methodology [he cites Ralph Rowbottom: *Social Analysis*: *A Collaborative Method of Gaining Usable Scientific Knowledge of Social Institutions*, 1977],
2. the discovery of a link between "managerial authority' and "accountability",
3. the discovery of "time span of discretion" (TSD),
4. the discovery of "felt-fair pay" (FFP),
5. the discovery of organizational strata based on differential behavior, and finally,
6. the discovery of "levels of abstraction" in the 1970s by Jaques, Dr. D. John Isaac, and their Brunel colleagues.

I must add at this point that it was the last discovery as written up in their book [8] *"Levels of Abstraction in Logic and Human Action: A Theory of Discontinuity in the Structure of Mathematical Logic, Psychological Behavior and Social Organization"* that was by far the most difficult to get to terms with. It is also the discovery that underpins Jaques and Cason's[9] later work "*Human Capability*" and Jaques' ultimate and I believe his best book, "*The Life and Behavior of Living Organisms: A General Theory*."[10]

It was on the basis of the six afore mentioned discoveries that Jaques formulated his Stratified Systems Theory, which in turn formed the basis of his theory of Requisite Organization. However the book is merely the tip of the iceberg that keeps it all afloat. My thesis is to examine all that which underpins Jaques' all encompassing "*Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century*" from the milieu during which he started to formulate the ideas, the philosophy it creates and the conclusions it ultimate leads to. I will endeavour to compare his discoveries with some of the current positions being held in the field of sensemaking.

In particular I hope to show that Jaques' work codifies a deeper layer of sensemaking than Weick, almost as if, to use a computer as metaphor, Weick is Assembly language[11] then

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[8] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978)

[9] (Jaques, Elliott, and Cason, Kathryn, 1994)

[10] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002)

[11] An assembly language is a low-level programming language for computers, microprocessors, microcontrollers, and other programmable devices. It implements a symbolic representation of the machine

Jaques is Machine Code[12]. Weick observes the phenomena that constitute sensemaking whereas Jaques has not only codified the logic on which all these phenomena are based, but also discovered a way to measure its "properties."[13] I find it intriguing that metaphorically speaking, Jaques concept of current capability can almost be mapped to a computer's Randomly Accessible Memory; no matter how big the hard drives' addressable memory (recall) is or how fast the CPU clock-speed is (IQ), performance is limited to that which can be held in memory at any given point in time.

Jaques is rigorous in his conceptualization, terminology, and definitions and is fond of circumscribing words by examining their etymological sources first[14]. It can thus be said that his terminology is etymologically well grounded. The categories he uses throughout are entities, attributes, judgements and preferences. An entity is something that not only exist either singly or in multiples in such a way that they can be counted separately, but also have attributes, these being properties that can be physically measured in an unambiguous manner.

Judgements and preferences

But first we have to attempt to answer as to why, given the amount of work done by Jaques and around Jaques' work why he is rarely mentioned in the main stream management and sense making fields.

With Chapter Two I will endeavour to explain *Requisite Organization* as simply as possible, highlight the many aspects of theory, especially in light of criticisms such as *Requisite Organization* being labelled "authoritarian" "neo-tayloristic", even "neo-fascist"[15]. One of the further criticisms levelled at Jaques & Cason's concept of "Human Capability" is ethical in its nature in that "it is fundamentally wrong to pigeonhole or label as having this or that level

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codes and other constants needed to program a given CPU architecture. This representation is usually defined by the hardware manufacturer, and is based on mnemonics that symbolize processing steps (instructions),processor registers, memory locations, and other language features. An assembly language is thus specific to a certain physical (or virtual) computer architecture.

[12] Machine code or machine language is a system of atomic instructions executed directly by a computer's central processing unit. Each instruction performs a very specific task, typically either an operation on a unit of data (in a register or in memory, e.g. add or move), or a jump operation (deciding which instruction executes next, often conditional on the results of a previous instruction). Every executable program is made up of a series of these atomic instructions. Machine code may be regarded as a primitive (and cumbersome) programming language or as the lowest-level representation of a compiled and/or assembled computer program.

[13] (Jaques, The Form of Time, , 1982), as defined on p 165 , 177 onwards.

[14] He states that most of the etymological sources used are from W. W. Skeat (1909) *Etymological Dictionary of the English Language*, 3rd edition, Oxford.

[15] (Solaas, August 2003) p16: "Requisite Organization theory is considered by some to be an outdated authoritarian model. It has been labeled "neo-tayloristic", even "neo-fascist". Jaques has been called "omnipotent" and "big brother". Supposedly it aims to rigidly specify everything in order to control human behaviour. This is an extreme of misunderstanding."

of potential capability. It is held to be degrading, or diminishing, or derogatory to suggest that someone had the potential capability to work "only" at, say, shop floor level, or "merely" as a tradesperson or clerk or-a junior supervisor and so on."[16] This is symptomatic of the postmodernist dichotomy in which he embraces determinism in general on the one hand but revolts when confronted with a particular determinism from which there appears to be no escape.

With the writing of this thesis I hope to present Jaques as a sense-maker whose theories deal in universals as opposed to particulars. Most of the current theories in management pertain only to homo sapiens in particular, but our role on the planet is relevantly recent in the very long history of the planet and life has been making sense of it for eons. Because we have the ability to verbalize ideas and thoughts that have no bearing on reality, Jaques refers to them as "unicorns" – everybody knows what they are but they have never really existed, and thus suffer from the weakness of being able to believe "anything," I believe that there is a need for a more universal view than that which we are currently engaged with. I admit that this book is more about Jaques than sense-making, my intention being to present Jaques' work as a basis for sensemaking that is universally applicable to all of life by first explaining it in terms of Maturana and Varela's concept of autopoeisis and then comparing it with Weick.

By the end of the thesis, I hope to have convinced the reader that Jaques, far from being a 20th century relic, is in actual fact a sense maker extraordinaire.

[16] (Jaques, Elliott, and Cason, Kathryn, 1994), p *xii*.

Chapter 2
Social Analysis

"To man qua man we readily say good riddance."[17]

2.1 Hierarchies since the beginning of History

It was one of Jaques' claims that "hierarchies have been around for 3 000[18] years and will be around for another 3 000 years" that started me thinking about *Requisite Organization* with greater interest. He is correct in that since man has organised himself firstly into families, then clans and tribes etc., there has always been a discernable hierarchy ordering the responsibilities, privileges & status of each member of the group. It is how the various positions in the hierarchy are structured and filled that became the subject of Jaques' enquiry for almost all of his 56 years of research.

Deuteronomy[19] 1:15 stated "So I took the heads of your tribes, wise men, and full of knowledge, and made them heads over you, captains of thousands, and captains of hundreds, and captains of fifties, and captains of tens, and officers, tribe by tribe" and that can be dated ~ 1200 BCE; it is almost as if in the Judeo-Christian tradition, hierarchies were ordained by God himself. It is interesting to note that both the structure, "captains of thousands…" and the incumbents, "heads of tribes, wise men, and full of knowledge" were well defined and that leadership, wisdom and knowledge took precedence.

Looking outside the ambit of human organization to nature we find hierarchies everywhere, be it in the way collections of different animals congregate or even in the overall structure of say the "food chain".

Bang et al observed the following[20]:

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[17] (Skinner, 1971)

[18] (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999) Page Pair 1 , (Jaques, Elliott; Clement, S. D., 1994) p 14

[19] 1611 King James Bible

[20] (Alok Bang,Sujata Deshpande,Annagiri Sumana,Raghavendra Gadagkar, 2010) i.e. (Choosing an appropriate index to construct dominance hierarchies in animal societies: a comparison of three indices, 2010)

> In animal societies individuals often engage in aggressive interactions with each other. When winners and losers are easily identified, such interactions are usually referred to as dominance–subordinate interactions. Based on who wins against whom, all or most individuals can be ranked in a dominance hierarchy. Ever since the discovery of this phenomenon in the domestic chicken, *Gallus gallus*, by Schjelderup-Ebbe (1922), dominance hierarchies have been studied in a large number of vertebrate and invertebrate animal societies.

It appears that not even the humble chicken run is exempt from the hierarchical structure; this is where the expression "pecking order" is derived from.

Whereas it has really always been the method of determining the "who gets what where how" in human hierarchies that has caused the strife all throughout history[21], the concept of the hierarchy was never really been under attack, until recent times. So the reason(s) to dismiss manifested hierarchies may be legion, but to dismiss the concept of a hierarchy out of hand is an error.

I suspect that the true basis for this rejection is more philosophical than meets the eye. Even though the Judeo Christian consensus prevailed in the West until the 1960s, three forms of reductionist determinism[22] matured in Western society and its organizations around this time. These are still with us today and can be listed as Sigmund Freud's psychological determinism, B. F. Skinner's sociological determinism through conditioning, and Francis Crick's chemical/genetic determinism.[23] The key to Jaques' exclusion from the mainstream of management theory and decision making lies in the fact that the latter is grounded in these three determinisms, while in my view Jaques' research and work created a fourth, which I have termed "Jaquian determinism," and this is the well spring of *Requisite Organization*.

2.2 The rise of dialectical humanism

The migration of Western thought forms from its Christian basis to modern man's current humanistic dichotomy where meaning and values are completely separated from reason has

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[21] There have been cataclysmic attempts to destroy existing hierarchies, i.e. the French & Bolshevik revolutions, but these have ultimately just replaced one imperfect hierarchy with another.

[22] (Schaeffer, How Should We Then Live?, 2005), p 164: "The terms determinism or behaviourism indicate that everything people think or do is determined in a machinelike way and that any sense of freedom or choice is an illusion."

[23] (Schaeffer, How Should We Then Live?, 2005) p 228.

been well documented and it is not my purpose to treat the matter here in an exhaustive fashion.[24] Briefly stated, the history of Europe over the last millennium's latter half of can be broadly categorized as being determined by the Reformation in the north and the Renaissance in the south. In the 13th century, Thomas Aquinas held that whereas man was morally fallible in the realm of absolutes, his intellect was not, and could therefore improve his condition on earth through application of the same to the particulars surrounding him. As a result of this line of thought, he successfully introduced ancient Greek philosophy into the Roman Catholic Church's thinking that continued over the centuries that followed. It is interesting to note that both the Roman Catholic Church and the Moslem world view of the 16th century were under "the combined influence of Aristotelianism and Neo-Platonism,"[25] in which science was considered an aspect of philosophy; philosophy uses authority as its basis, whereas true science requires observation or empiricism. Aristotle's teachings favoured the particulars while neo-Platonism placed more emphasis on the universals. A new philosophical base for science that challenged this Aristotelian view had emerged in Oxford England in the twelfth and thirteenth centuries through the writings of Robert Grosseteste (c.1175-1253) and Roger Bacon (1214-1294), but only really took hold during the fifteenth and sixteenth centuries. It was during this time that Galileo was denounced as a heretic, even though his scientific observations could not be shown to be un-Biblical; they as well as his defence of Copernicus were however anti-Aristotelian.[26] It can be said that the Bible based non-Aristotelian view of science was based on the "concept of the uniformity of natural causes in an open system, or, as it may also be expressed, the uniformity of natural causes in a limited time span."[27] Because of man's relation to God, he was considered outside and separate from the universe, and the universe's "open"[28] nature enabled man to observe and discover it in a rational way.

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[24] For a more complete treatise on the subject, please see (Schaeffer, How Should We Then Live?, 2005).

[25] Ibid p 130.

[26] Ibid, p 131.

[27] Ibid p 142.

[28] Ludwig Bertalanffy describes two types of systems: open systems and closed systems. The open systems are systems that allow interactions between its internal elements and the environment. An open system is defined as a "system in exchange of matter with its environment, presenting import and export, building-up and breaking-down of its material components."[1] For example, living organism. Closed systems, on the other hand, are considered to be isolated from their environment. For instance, thermodynamics applies to closed systems. The idea of open systems was further developed in systems theory. For instance, open systems in systems theory encourage a non-representational and non-referential post-humanist approach that actualize complexity of reality in a non-deterministic framework.

http://en.wikipedia.org/wiki/Open_and_closed_system_in_social_science

Joseph Needham[29] makes use of this argument when he tries to explain the limited scientific development in China as follows: “There was no confidence that the code of Nature’s laws could ever be unveiled and read, because there was no assurance that a divine being, even more rational than ourselves, had ever formulated such a code capable of being read.” The Catholic Church’s rejection of the modern science spurred thinkers during the earlier Renaissance to at first to try and syncretise Christianity with Aristotle and later Christianity with Platonism, but when these attempts failed, they drifted to the classical humanism of the ancient Greeks and Romans instead.

The Enlightenment as lead by Rene Descartes, Voltaire, followed by Rousseau, Hegel and Kant, built on the Renaissance culminating in the upheaval of the French revolution continued in the Thomas Aquinas vein to the extent that the excesses committed in the name of the “Declaration of Rights of Man and Citizen” (1789) during the Terror of 1792 -1794 in France were seen as an expression of “the idea of the limitless perfectibility of the human species . . . ." as written by the Marquis de Condorcet shortly before his death in Paris prison.[30] The emphasis remained Aristotelian in that the focus remained on particulars, the constant differentiation of particulars into their underlying particulars, ultimately to molecules, atoms etc. The basic building blocks of antithesis and the Christian worldview of man outside of the cosmic “machine” held sway up until the end of the 18th century.

The 19th and early 20th centuries saw a shift away from the Christian “open” universe, first philosophically through the work of Ludwig Feuerbach[31], followed by a physician Ludwig Buchner[32] and the biologist Ernst Haeckel[33] that promoted the idea of all of man being

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[29] (Needham, 1970)

[30] (Schaeffer, How Should We Then Live?, 2005) p 121. The Marquis de Condorcet (1743-1794) was a mathematician in Voltaire's circle and who was the author of *Sketch for a Historical Picture of the Progress of the Human Mind* (1793-1794),

[31] Ibid p 147. Ludwig Andreas von Feuerbach (July 28, 1804– September 13, 1872) was a German philosopher and anthropologist, whose thought contributed to the development of dialectical materialism, where he is often recognised as a bridge between Hegel and Marx.

[32] Ibid p 147. Friedrich Karl Christian Ludwig Büchner (29 March 1824 – 1 May 1899) whose book *Force and Matter* posited that nature is purely physical; it has no purpose, no will, no laws imposed by extraneous authority, no supernatural ethical sanction.

[33] Ibid p147. Ernst Heinrich Philipp August Haeckel (February 16, 1834 – August 9, 1919) wrote *The Riddle of the Universe at the Close of the 19th Century* in 1899. Haeckel put forward a doctrine of evolutionary polygenism based on the ideas of the linguist August Schleicher, in which several different language groups had arisen separately from speechless prehuman *Urmenschen*, which themselves had evolved from simian ancestors. These separate languages had completed the transition from animals to man, and, under the influence of each main branch of languages, humans had evolved — in a kind of Lamarckian use-inheritance — as separate species, which could be subdivided into races. From this Haeckel drew the implication that

explained in terms of nature only or "the uniformity of natural causes in a closed system."[34] These are by no means the only influences in the development of materialism in the 19th century as there were many others such as Charles Lyell[35] and Charles Darwin[36], Thomas Huxley[37], Herbert Spencer[38], Walter Bagehot[39] across the channel, but they all contributed to the optimistic conclusions that can best be expressed in the following extract from the book *The Ascent of Man* written by Jacob Bronowski[40] in 1973: "We are nature's unique experiment to make the rational intelligence prove itself sounder than the reflex. Knowledge is our destiny. Self-knowledge, at last bringing together the experience of the arts and the explanation of science, waits ahead of us."

It was also during these centuries that Sigmund Freud, influenced by the writings of Nietzsche and Franz Brentano[41], developed his determinism that "rests upon the child's relationship to its mother during the early portion of its life and that this sets the pattern of the child's psychological makeup."[42] In addition his concepts of the pleasure[43] and reality[44] principles are important to Jaques work.

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languages with the most potential formed human species with the most potential, led by the Semitic and Indo-Germanic groups, with Berber, Jewish, Greco-Roman and Germanic varieties to the fore.

[34] Ibid p 146.

[35] Ibid p 149 Sir Charles Lyell, 1st Baronet, (14 November 1797 – 22 February 1875), British lawyer and the foremost geologist of his day, best known as the author of Principles of Geology, which popularised the idea that the earth was shaped by slow-moving forces still in operation today.

[36] Ibid p 149 Charles Robert Darwin FRS (12 February 1809 – 19 April 1882) was an English naturalist and author of many books, the most famous being the *Origin of the Species*.

[37] Ibid p 149, Thomas Henry Huxley PC FRS (4 May 1825 – 29 June 1895) was an English biologist, known as "Darwin's Bulldog" for the defence and advocacy of Charles Darwin's theory of evolution, and participated in now famous 1860 debate against Samuel Wilberforce that became a watershed in the effort to promote the acceptance of evolution.

[38] 149. Herbert Spencer (27 April 1820 – 8 December 1903) was an English philosopher, biologist, sociologist, and prominent political theorist credited with the concept "survival of the fittest" in his book *Principles of Biology*.

[39] Ibid p Walter Bagehot (3 February 1826 – 24 March 1877) was an English businessman, essayist, and journalist who as editor-in-chief of *The Economist*, wrote extensively about literature, government, and economic affairs.

[40] Ibid, Jacob Bronowski (18 January 1908 – 22 August 1974), a Polish-Jewish British mathematician, biologist, historian of science, theatre author, poet and inventor, best remembered as the presenter and writer of the 1973 BBC television documentary series, The Ascent of Man, and the accompanying book.

[41] Franz Clemens Honoratus Hermann Brentano (January 16, 1838 – March 17, 1917) was an influential German philosopher and psychologist who had a special interest in Aristotle and scholastic philosophy and was well known for claiming that 'perception is misception' or 'truth-grasping is false-grasping'.

[42] Ibid p 228.

[43] In Freudian psychology, the pleasure principle is the psychoanalytic concept describing people seeking pleasure and avoiding suffering (pain) in order to satisfy their biological and psychological needs. In infancy and early childhood, the Id rules behaviour by obeying only the pleasure principle. Maturity is learning to endure the pain of deferred gratification, when reality requires it; thus, the psychoanalytic Sigmund Freud

One can conclude that the philosophy and science of these two centuries had firmly set the west on a humanist course that differed from the Christian consensus of the Reformation and held by the Renaissance at its beginning, in that man and his behaviour was now reducible to nature alone and as such needed to reorder society on the basis of “new” presuppositions..

This reinforced the egalitarianism[45] started in Paris during the French revolution, brutally enforced during the Russian revolution through the total destruction of the ruling class hierarchy and refined by the NAZI party in Germany in the years leading up to the second world war.[46] Their obsession with Aryan superiority can be traced back to the work of Ludwig Feuerbach and Ludwig Buchner. This ultimately translated into “the law of nature must take its course in the survival of the fittest” and the replacement of “Christianity and its notion of charity should be "replaced by the ethic of strength over weakness."”[47]

It was at this juncture when the determinisms of Skinner and Crick were added to that of Freud. The notion that the old man with his superstitions, religions, and romanticism could be dispensed with and a new world built on self-knowledge could rescue man from himself, from the horrors of war and the evils of his natural inclination.

2.3 The Deterministsts

During the first part of the 20th century, the west’s organizational structures were informed by the likes of Frederick Winslow Taylor[48] and Frank Gilbreth[49], as refined by Charles

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proposes that “an ego thus educated has become ‘reasonable’; it no longer lets itself be governed by the pleasure principle, but obeys the reality principle, which also, at bottom, seeks to obtain pleasure, but pleasure which is assured through taking account of reality, even though it is pleasure postponed and diminished”.

[44] Similarly the counterpart concept of the reality principle describes people choosing to defer gratification of a desire when circumstantial reality disallows its immediate gratification. Maturity is learning to endure the pain of deferred gratification, when reality requires it; thus, the psychoanalytic Sigmund Freud proposes that “an ego thus educated has become ‘reasonable’; it no longer lets itself be governed by the pleasure principle, but obeys the reality principle, which also, at bottom, seeks to obtain pleasure, but pleasure which is assured through taking account of reality, even though it is pleasure postponed and diminished”. http://en.wikipedia.org/wiki/Pleasure_principle_(psychology)

[45] An egalitarian believes that equality reflects the natural state of humanity.

[46] The Hitler Youth instilled the classless society doctrine by making all youngsters wear the same uniform, and put more emphasis on physical and military training than on academic study. By creating an egalitarian youth, they intended to remove the old social classes and create a classless socialist society.

[47] (Schaeffer, How Should We Then Live?, 2005), p 151.

[48] Frederick Winslow Taylor (March 20, 1856–March 21, 1915), widely known as F. W. Taylor, is regarded as the father of scientific management and was one of the intellectual leaders of the Efficiency Movement. For further information and sources please see http://en.wikipedia.org/wiki/Frederick_Winslow_Taylor.

Bedaux[50]. They seem to intuitively act on the philosophy of humankind not only being part of the machine, but also a machine on his own and could therefore be regulated as a machine. The world had witnessed the organizational capability and success of the archetypical hierarchical system of the Allies' war effort and subsequent victory in the 1940s. But the use of atomic weapons and the resultant nuclear arms race in the 1950s and 1960s was the source of tremendous anxiety as humanity had developed the ability to annihilate itself.

During the 1960s and 1970s the publication of works such as Jacques Monod's "Chance and Necessity", Francis Crick's "Of Molecules and Men" and "The Origin of the Genetic Code" and BF Skinner's "Beyond Freedom and Dignity" led to a shift in the how human beings came to view themselves.

Monod wrote

> … Chance alone is at the source of every innovation, of all creation in the biosphere. Pure chance, absolutely free but blind, at the very root of the stupendous edifice of evolution: this central concept of modem biology is no longer one among other possible or even conceivable hypotheses. It is today the sole conceivable hypothesis, the only one that squares with observed and tested fact. And nothing warrants the supposition – or the hope – that on this score our position is likely ever to be revised.[51]

Despite it being a biological treatise, it contained tremendously destabilizing philosophical implications, so much so that he concluded with the following:

> The ancient covenant [between man and the universe] is in pieces; man knows at last that he in the universe's unfeeling immensity, out of which he emerged only by chance. His destiny is nowhere spelled out, nor is his duty. The kingdom above or the darkness below: it is for him to choose. [52]

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[49] Frank Bunker Gilbreth, Sr. (July 7, 1868 - June 14, 1924) was an early advocate of scientific management and a pioneer of motion study. For further information and reading please see (George, 1968) or (Frank_Bunker_Gilbreth,_Sr., 2010).

[50] Charles Eugène Bedaux (26 October 1887 – 18 February 1944) was one of the leading contributors in the field of scientific management in his time and introduced the concept of rating assessment and timing work which led to great improvements in employee productivity. Bedaux built on Fredrick Winslow Taylor and Frank Gilbreth's theories to develop methods of speeding up production through time measurement, loss minimization & pay incentives. For further information and reading please see (Charles_Bedaux, 2010).

[51] (Monod, 1971), p112 – 113.

[52] Ibid p 180.

Francis Crick confirmed this line of thought with the statement "We'd like to know more about mental health – how much is genetically determined and how much depends on the environment."[53] It was no longer the short comings of man's soul or his "sin" that was responsible for his behaviour, no more the options of heaven or hell to determine and moderate his behaviour; it was a question of genetics and environment. The second world war, the atomic bomb, the cold war could all be related to the homo sapiens' genetic and psychological short comings.

But it was possibly BF Skinner's "Beyond Freedom and Dignity" that had the greatest influence. He did not mince his words – on page 21 he stated that "personal exemption from a complete determinism is revoked as the behaviour of the individual." Further in the book he goes on to say:

> To man qua man we readily say good riddance. Only by dispossessing him can we turn to the real causes of human behaviour. Only then can we turn from the inferred – to the observed, from the miraculous to the natural, from the inaccessible to the manipulable.[54]

Skinner was aptly summed up by T. George Harris as follows:

> In cold blood, Skinner seeks to destroy our pretentions to the freedom and dignity whose literature is written in brave blood. To place, Skinner offers the passionless hypothesis of his experimental laboratory: each man and woman is a unique bundle of behaviours determined by environment; only that, and nothing more. Through evolution the environment selected the behaviours that survive in our genes, and environmental conditioning shapes each of us in this life. If you would control, or change, human behaviour, you need only control environment. [55]

Human beings were now considered to be just molecules and learned behaviour as determined by his environment and could be manipulated by drugs, the media, and education. It was as if having concluded that human beings were the products of time and chance, that everything human beings had done before were also based on time and chance, and now that human beings knew this, they could set about ordering his future in a "new" way. Gone was

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[53] (Schaeffer, Back to Freedom and Dignity, 1973), p 19. Francis Crick: *Why I Study Biology,* extract from a speech made in St. Louis in March 1971.

[54] (Skinner, 1971), p 200 – 201.

[55] (Schaeffer, Back to Freedom and Dignity, 1973), p 41. Also found in (Harris, 1971), p 33.

"free will", as this makes humankind capable of a combination of predictable and unpredictable behaviours[56]. Crick advocated intervention at the early school level, and believed that "… if you learn something when you're in school, you're forced to learn it in a more regular way. You absorb it, to some extent, at a more impressionable period; you're made to exercise on it. And I think really there should be some thinking if we're to take this new view of looking at man."[57] We no longer are what we are, but become what we learn to be. The anxiety of the time prompted contemporary luminaries such as Arthur Koestler to suggest the possibility of putting chemicals in the drinking water in order to make human beings more peaceful and argued "that the psycho-civilising process can begin none too soon if man is to be saved from himself."[58]

At this point we have these three forms of determinism well entrenched. They can be summarized as follows:

1. Psychological determinism, based on the child's relationship to its mother during the early portion of its life. Melanie Klein, under whom Jaques studied Psychoanalysis, also did a lot of work with children.
2. Sociological determinism[59], primarily involving conditioning (behaviourism), posits that all that people are can be explained by the way their environment has conditioned them. Since society plays an especially important role in that environment, society can and should use positive stimuli to bring about the society it wants.
3. Chemical/genetic determinism, emanating from the discovery and the further decoding of the human genome that will enable "genetic engineering."

Of the three determinisms above, the sociological determinism lends itself to the mass reconstruction of society and as such gave rise to the idea that a person could be anything they wanted to be. All they had to do was overcome limitations imposed on them by their parents, the psychological determinism, and the conditioning their environment constrained them with, the sociological determinism, and all would be good. As can be seen from the all of the above, the source of this optimism, that humankind starting with itself, could create its own categories and absolutes, began with the Renaissance, and with its knowledge of DNA

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[56] (Wogaman, 2000), p7

[57] (Schaeffer, Back to Freedom and Dignity, 1973), p 22. Francis Crick: *Why I Study Biology*, extract from a speech made in St. Louis in March 1971.

[58] (Schaeffer, Back to Freedom and Dignity, 1973), p 28. Koestler was quoted from *Horizon*, Spring 1968, p. 43 and a *Newsweek* article. Koestler authored the Book *The Ghost in the Machine.*

[59] (Schaeffer, How Should We Then Live?, 2005), p 229.

and the help of the sociological sciences, if they put their minds to it, nothing was impossible for them.[60]

2.4 The Early Jaques

Having studied under Melanie Klein, Jaques at first based his work on psychological determinism, but as his work progressed he discovered a different form of determinism which renders the above view untrue.

This is not to say that Jaques rejects this point of view entirely; Jaques came to understand human beings from a very different view point as I hope to show in the pages below. However they were tumultuous times and played a large role in determining the future direction of the research effort into understanding human beings. It is interesting to note that Jaques is remembered for his work done in the 1950s, well before this period. His later work is less well known and his books are not available in the main stream booksellers[61].

The advent of humankind made up of molecules and genetic and environmental behaviours led to the emergence of the behaviourist view of man and in my view accelerated the divergence from the "organizational" theorists as epitomized by Taylor and Bedaux in favour of the behaviourism as typified by Herzberg, Maslow et al. These are the "fads"[62],[63] that Jaques refers to in Requisite Organization and his rejection of their theories, albeit for entirely different reasons, relegated him to the structuralism camp and thus old fashioned.

But Jaques' counter to this was eloquently expressed in the chapter "The Science of Society"[64]. He asked why after 300 years of scientific and technical advance there is "so little development in the use of scientific method in the government, in administration, and in the management of society and its institutions." He did not mince his words as evidenced in the following excerpt:

> Disciplined description meets resistance, for it seems to challenge the freedom of the human spirit - the freedom of ideas. What in fact is challenged is a spurious freedom,

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[60] Genesis 11:6 - LORD said, "If as one people speaking the same language they have begun to do this, then nothing they plan to do will be impossible for them. (New International Version)

[61] When I first looked for a copy of Requisite Organization, I could only find a used one on Amazon at a royal price of $500! Fortunately the internet has enabled me to recently purchase them directly from Cason Hall & Co.

[62] (Jaques, Working Paper # 1003: Alchemy & Management Science, 1998),

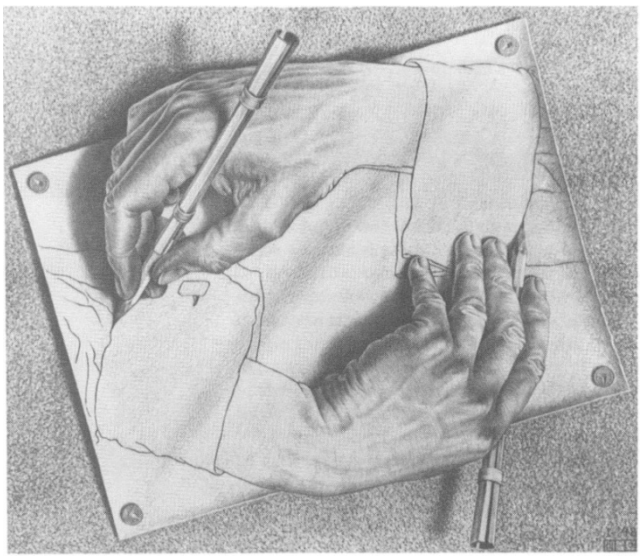
[63] (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999), pairs 9, 10 & 11

[64] (Jaques, Creativity and Work, 1990)

> one not worth preserving. It is the freedom to believe that, because we think something, then it must be so - a kind of *cogito ergo est*! …. The anxiety about freedom shows in countless ways. One of these ways - and a most important one, widespread in its manifestations - is the cultivation of vagueness and confusion in our own organizations[65]. The slogan is: "Let us leave it vague so that individual creativeness can have a greater chance!" Even some social scientists favour this outlook, and express it in the concept of informal organization; that is to say, in purposely leaving unspecified the responsibility in certain areas of organization, in which individual endeavour is allowed to express itself in personal networks, idiosyncratic to the persons who happen to be in the organization at a given time. [66]

The counter to those propounding the new age lies in Jaques' question i.e. after 300 years things are still the same in governments etc. The answer is that the likes of Monot, Crick and Skinner assume that the current state of man is not the product of man himself, but of philosophy and religion. But is philosophy and religion not man's response to himself as opposed to man being the product of philosophy and religion? Which came first, the chicken or the egg? Human beings and the institutions they bring forth are self referencing. Furthermore they are not brought forth by chance, but are a reflection, a product of the way he thinks. Understand how he thinks, and you will understand his institutions.

The lithograph by M C Escher[67] says it better than words:



[65] Refer to the criticism mentioned in the introduction.

[66] (Jaques, Creativity and Work, 1990) p 3 – 4.

[67] Lithograph by Dutch artist M.C. Escher, first printed in January 1948. It is referenced in the book Gödel, Escher, Bach by Douglas Hofstadter, who calls it an example of a strange loop.

Skinner's bold statement "Man qua man is dead" rings rather hollow when we realize we are what we are because of who we are. Skinner's is the equivalent of saying, we have discovered the periodic table and how chemistry works and because we don't like the world around us we are going to manipulate the elements to suite our selves, i.e. change lead into gold through alchemy. Jaques is explicit in his criticism and says the following:

> Much of managerial and organizational "theory" has for me the quality of alchemy up to the middle of the sixteenth century. This statement is meant to be a serious, technical statement, and not a bad joke. I am referring to the absence of sound concepts, and the use of undefined or badly-defined ideas, that lead inevitably to formulations that can neither be systematically nor uniformly applied.
>
> Another aspect of the same problem is the confusion of desires with goals, of wishes with what to do about them.[68]

To his discredit, he completes the paper with the following "moral":

> Moral: No amount of alchemy doth scientific chemistry make-nor did the alchemists develop scientific chemistry. Like the old soldiers who never die, the alchemists just faded away.[69]

With provocative language like the above it is not surprising that his work is ignored by the main stream managerial and organizational theorists, and while it may be considered socially unacceptable to say such things, rejecting his work on this basis as opposed to by reason of scientific rigour, smacks of unprofessionalism.

Over time Jaques came to realize that hierarchy had been an institution that served human society well for over 3000 years. Whereas the last 300 years of industrialization had put pressure on the efficacy of the hierarchy, and much of the management science of the late 19th and early 20th century had produced inefficient bureaucracies, hierarchy and bureaucracy are not necessarily one and the same thing[70]. It was a further concern to him that whereas the ability to measure the non-living categories of our universe and the adoption of well derived methods of quantification and investigation had served science in good stead, the social

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[68] (Jaques, Working Paper # 1003: Alchemy & Management Science, 1998), p 1.

[69] (Jaques, Working Paper # 1003: Alchemy & Management Science, 1998), p 3.

[70] (Jaques, Working Paper # 1005: Essential Developments in Bureaucracy , 1997)

sciences needed to catch up and produce its own scientifically based measures and definitions. As referred to earlier on page 14, the concept of "free will" implies a degree of unpredictability, not complete unpredictability. Wogaman expresses it as follows:

> In retrospect, it is always possible to say why things have happened as they did. It is not easy to say what will happen in the future!
>
> We should not be surprised by this. [Politics] has to do with people, and people are both predictable and unpredictable. If there is such a thing as freedom of the will, then we must expect to be surprised, now and again, by human behaviour. An exact science of human behaviour is not a possibility as long as the object of study is not fully predictable. At the same time, the predictable element in human life is substantial enough to make the discussion… interesting and productive.[71]

As we shall observe further through the text, Jaques always tried to be very clear in his terminology and definitions, very much in the "Logico-Scientific Mode of Thought"[72].

I will return to Jaques research and finding further down in the chapter.

2.5 Elliott Jaques and his work

Elliott Jaques spent 52 years in management research; from his first book in 1951[73] until 2002, a year before his death at 86 years of age, he was actively pursuing the formulation of standards of measurements in the social sciences that were the equivalent of the Cartesian coordinate system. His last two books, "Social Power and the CEO" and "The Life and Behaviour of Living Organisms", both published in 2002, set out the conclusions of an extraordinary life's work. His book "Requisite Organization" is more of a cryptic expose of

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[71] (Wogaman, 2000), p7.

[72] (Tsoukas, 2005), p 232 etc. It would be an interesting exercise to compare the Logico-Scientific and Narrative Modes of Thought to the cognitive processes "time-of-succession" and "time-of-intention" Jaques describes in *The Form Of Time* (Jaques, The Form of Time, , 1982).

[73] Social Power and the CEO (2002), The Life and Behaviour of Living Organisms (2002), Requisite Organization (revised 1996; 1989), Human Capability (1994), Executive Leadership (1991, with Stephen Clement), Creativity and Work (revised 1990; 1970), The Form of Time (1982), Free Enterprise, Fair Employment (1982), Levels of Abstraction (1978, with RO Gibson, and DJ Isaac), A General Theory of Bureaucracy (1976), Fair Pay and Work (1971, with Roy Richardson), Glacier Project Papers (1965, with Wilfred Brown), Product Analysis Pricing (1964, with Wilfred Brown), Time-Span Handbook (1964), Equitable Payment (1961), Measurement of Responsibility (1956), The Changing Culture of a Factory (1951)

his solution for the management of modern global companies, with hardly any external references to substantiate his arguments. To fathom this you have to read all his other books, which is what I have done.[74]

It is in one of his final books, "The Life and Behaviour of Living Organisms" that Jaques draws all his research into a "magnum opus" that crowns the previous 50 years of research and work. It can be viewed as carrying on from where Maturana and Varela[75] stopped in the "The Tree of Knowledge". Jaques picked up on a number of the concepts used in this book and extended them not only to describe all the living organisms inhabiting this planet, from amoebas to Homo sapiens, but also differentiate the latter from the rest. This implies that if one were to describe modern organizations metaphorically, Jaques' Requisite Organization could be described more as a ecosystem[76] as opposed to a brain, or for that matter even a symphony, as he himself is want to describe it.

Jaques, born in Canada in 1917, obtained his first degree in psychology from the University of Toronto and then completed a MD Psychoanalysis at Johns Hopkins Medical School (1941). This he followed up with a PhD in Social Relations from Harvard. By this time the Second World War was at its height and he relocated to England as a Major in the Canadian Army Medical Corps where he assisted the Canadian Army in officer selection. During this period he ended up acting as the liaison officer with the Psychiatric Division of the British Army, which at the time was under the command of Brigadier JR Rees, formerly head of the Tavistock Clinic. Directly after the war Jaques trained as a psychoanalyst at this institution. By his own account his education in medical science and social sciences was "topped by a qualification as a psychoanalyst, with Melanie Klein." Melanie Klein[77] and other

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[74] Please see Appendix B for a time line of Jaques life and work.

[75] (Maturana HR, 1998)

[76] I will detail this conclusion towards the end of the chapter.

[77] Melanie Klein (30 March 1882 – 22 September 1960) was an Austrian-born British psychoanalyst who devised novel therapeutic techniques for children that had a significant impact on child psychology and contemporary psychoanalysis. She was a leading innovator in theorizing object relations theory. Melanie Klein's works are collected in four volumes:

"The collected Writings of Melanie Klein"

Volume 1 - "Love, Guilt and Reparation: And Other Works 1921-1945", London: Hogarth Press.

Volume 2 - "The Psychoanalysis of Children", London: Hogarth Press.

Volume 3 - "Envy and Gratitude", London: Hogarth Press.

Volume 4 - "Narrative of a Child Analysis", London: Hogarth Press.

For more information please see http://en.wikipedia.org/wiki/Melanie_Klein

psychoanalysts pioneered ”Object Relations Theory”[78] from 1940 to 1950 as a theory of explaining the development of the human “mind as one grows in relation to others”, which is theoretically comparable to Maturana & Varela’s “structural coupling”[79] in cells and organisms and as extended to primates[80]. Object Relations Theory is by its nature structural which ultimately influential in Jaques adopting the “fix the structure and the person will fix himself” philosophy. Jaques remained in England after the war until 1977, after which he settled in the USA. During the time he was in England he was instrumental in establishing the Tavistock Institute of Human Relations[81]. This institute concerned itself with research in assisting institutions and businesses facing difficulties and Jaques first brief was a detailed study of the problems being experienced at the Glacier Metal Company, the results of which were published in a book “The Changing Culture of a Factory” (Jaques, The Changing Culture of a Factory, 1951). The book was favourably reviewed by Brown[82], Collins[83] and Noland[84]. The study made use of psychoanalytic as well as field theory[85] in a search to identify the underlying latent forces and group dynamics shaping the relationships in Glacier. In 1955 Jaques wrote an article “Social systems as a defence against persecutory and depressive anxiety”[86] in which his thesis was “that a social system, through unconscious processes and phantasy[87] produces a culture and structures whereby the individuals in the system are defended against psychotic anxieties’. Even though Jaques subsequently

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[78] Object Relations Theory posits that human beings are relationship seeking as opposed to Freud’s pleasure seeking through libidinal & aggressive drives.

[79] (Maturana HR, 1998), p

[80] Ibid p 191 -192. It is interesting to note that “[A]mong primates, … natural group behaviour (very different from their behaviour in captivity) manifest an ongoing and multiple interaction that is gestural, postural (visual), and tactile. It is a dynamic system of hierarchical relations. This system of hierarchical relations defines the cohesion of the group, ….”

[81] For more information please see http://www.tavinstitute.org/ . The Tavistock Institute has also been the subject of conspiracy theorist Dr John Coleman’s book “*The Tavistock Institute of Human Relations: Britain's Control of the United States.*” I have not read this book and can therefore not offer an opinion on its contents.

[82] (Brown, 1952)

[83] (Collins, 1952)

[84] (Noland, 1953)

[85] Field theory has it roots in Gestalt Theory and can be best summed up as “a ‘field’ is defined as ‘the totality of coexisting facts which are conceived of as mutually interdependent”. (Lewin, Resolving Social Conflicts & Field Theory in Social Science, 1997) p 240

[86] (Jaques, Social systems as a defence against persecutory and depressive anxiety, 1955)

[87] Whereas fantasy is daydreaming or imagined unreality, phantasy, as Klein’s concept, “emanates from within and imagines what is without, it offers an unconscious commentary on instinctual life and links feelings to objects and creates a new amalgam: the world of imagination. Through its ability to phantasize the baby tests out, primitively ‘thinks’ about, its experiences of inside and outside.” (Mitchell, 1986)

discarded[88] the hypothesis, Social Defense Theory has become a subject of research in its own right with a number of books written about the subject.[89] In his own words, Jaques ".. took a different path and dedicated myself to examine the organizational problems which required a specific comprehension and theory development." [90] Jaques justified his change in an address to the International Society for the Psycho-Analytical Study of Organizations in June 1992[91], in which he argued on the basis of accumulated field experience that it was due "to badly organized social systems that arouse psychotic anxieties and lead to their disturbing acting out and expression in working relationships"[92].

2.6 Structuralism vs. Behaviourism

Morgan wrote a chapter called "Organizations as Psychic Prisons"[93] in which he explains how "Human beings have a knack for getting trapped in webs of their own creation."[94] Morgan refers to Freud, Klein & Jaques in the section "Organization And Anxiety"[95], but makes no mention of Jaques' later work. The allegory of Plato's Cave is particularly instructive as one of Jaques final discoveries is that hierarchies reflect a structure in which human beings with different capabilities in logic inhabit the various levels that each requires a discreet level of logic. The hierarchy reflects levels of human capability brought forth by that very same human capability.

If one considers Klein's starting point that once a newly born infant leaves the safety of the womb that it has been able to trust for the previous nine months[96], it spends the next six months in the "paranoid-schizoid position" trying to deal with the psychological anxiety generated when a need arises and to formulate and establish at set of actions and procedures

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[88] (Schlemenson, 2005) p 351

[89] (Long, 2006)

[90] (Schlemenson, 2005) p 351

[91] This talk was published as (Jaques, Why the Psychoanalytical Approach to Understanding Organizations is Dysfunctional , 1995)

[92] Ibid.

[93] (Morgan, 1997) p 215 - 249

[94] Ibid,p 215.

[95] Ibid p 230 refers to (Jaques, Social systems as a defence against persecutory and depressive anxiety, 1955).

[96] Jaques refers to this "beginning" on page 102 of *Levels of Abstraction in Logic and Human Action* in the establishment of the very first "element" and the logic relations that follow as the child learns to deal with the initial state of "chaos; nothingness" upon entering the world.

to meet the need. Maturana & Varela[97] refer to this as "structural coupling between autopoietic entities" and serves as the ontogeny or beginning of knowledge for the infant and in the first six months it has to rely on the most primitive forms of signaling and the crudest methods of satiating these needs. As Jaques explains in On Trust, Good, and Evil[98],

> The survival of the infant during the first six months of life, requires that it should operate on the assumption (stated in adult terminology) that it must go after whatever it requires to satisfy its physiological needs in such a way as to seek to achieve full and immediate gratification, without frustration, and without any regard whatever for the needs or interest of others, including any litter mates, feeding breasts, or caring mothers or fathers, or whoever or whatever might be the source of gratification. In the mammalian kingdom in which multiple births are or had been the natural order of things, anything less than this unmitigated total physiological self-gratification would threaten the life of the infant. Survival against the competition of other members of the litter would go to the strongest and the selfish, while selflessness and consideration for others would be a deadly weakness in the survival stakes.
>
> Under such conditions of threat to one's continued physical existence, behaviours that are regarded as evil or destructive in adult life, may be seen to be constructively necessary in early infancy. You must attack the breast that feeds you, and attack it with the energizing sense of hate if it frustrates in any way. Faeces and urine become objects of hate if they cause discomfort and cannot be eliminated immediately. The good breast must be envied and attacked spitefully for being good, because if you love it you will be considerate and protective towards it, and will not feed in the lustful narcissistic manner that befits a surviving infant mammal.

Depending on the history it develops in the meeting of these needs, it progresses over time to what Klein refers to as the "depressive position", in which it has to explore and refine the more complex notions of hate and love. It stands to reason that the level of logical complexity required in the latter stage is higher than in the former and that the infant has to develop new "knowledge" in the process of learning to "trust" the new environment outside the womb. But the foundation has been laid; we are born with "original sin" and spend our lives at war with our basest of instincts.

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[97] (Maturana HR, 1998)

[98] (Jaques, On Trust, Good, and Evil, 2005) p 6

Fortunately mothers are structured in such a way as to be able to meet the most immediate need of feeding the infant, but even however well structured she may be, there are times when the performance of the structure (breast) is less than satsifactory and a split occurs in that which is loved and cherished reverts to being hated and attacked. This dichotomy is the foundation of our logic, the primal "or" logic as it were, of our responses, be they paranoiac or profiducial, to the the events and episodes that constitute our lives[99]. Jaques deduced that no amount of tinkering with the person would undo or change this primal knowledge system, but that if the structure, the breast, was "requisite", that is, structured in such a way so as to always satisfy the need and so ilicit the profiducial response as opposed to the paranoiac one, the stucture could then always be trusted and the levels of anxiety that inhibit harmony and creativity in human beings would be reduced.

I believe that this rock bottom starting point gives Jaques' work and theories great credence as from here he set about investigating how to shape the structure to best suite the men and women that would occupy the roles in the structure. He did not abandon his psycho-analysis background, but used this knowledge to create a theory of how organizations should be designed so as to fit the people occupying the roles as opposed to minupulating the people so as to optimize their performance in the design. In his search he discovered a process of maturation of the the human brain as it ages through four distinct and measureable levels of logic processing capabilities, which he termed the four mental processes and was able to map a one-to-one relationship between them and modern n-valued logic.[100] Jaques discovered through empirical research that, contrary to the the notion that human "intelligence" matures fully by 18 years of age, there are a number of maturation bands that can be used to predict the path along which the mental processing capabilities of human beings can be plotted over their life span.[101] Furthermore, because the starting point is neither gender or culture specific, the finding should be transportable between cultures and therefore globally applicable.

In the managerial organizational setting he formulated a method measuring the "size' of the various roles in terms of "Time-Span"[102]. His seminal work "The Form of Time"[103] is considered a definitive study on the subject. Jaques combined and condensed all this work

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[99] For Jaques' elaboration on this theme please see (Jaques, On Trust, Good, and Evil, 2005).

[100] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978). More of this book in Chapter 5..

[101] (Jaques, Elliott, and Cason, Kathryn, 1994)

[102] (Jaques, Measurement of Responsibility: a study of work, payment and individual capacity, 1956) and (Jaques, The Form of Time, , 1982)

[103] (Jaques, The Form of Time, , 1982)

into the subject under discussion in his book, “Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century”[104].

In “The Life and Behavior of Living Organisms: A General Theory”[105] he extends the theory to all of life on earth and expands on the role of “languaging”, as distinct from “signaling”[106], as being the main difference between Homo Sapiens and the rest. He also postulates that it is this very same unique ability that enables us to create “fantasies dressed up as reality” and is the cause of much of the difficulty in “our attempts to control our relationships with each other.” To counter this he proposes the creation of an Organizational Epistemology based primararily on entities, properties, preferences and probabilities.[107]

Jaques receieved many accolades in his life, the most significant being the Joint Staff Certificate of Appreciation presented by Colin L. Powell on behalf of the Joint Chiefs of Staff of the US Armed Forces for his "outstanding contributions in the field of military leadership theory and instruction to all of the service departments of the United States." By this time Jaques was 75.

2.7 Summary

I have shown how hierarchies have been the foundation of social relationships for all communal life forms since the beginning of history. However in the flow of human history, changes in philosophy and the rise of scientific capabilities in Western societies during the latter centuries have led to the rise of dialectical humanism. This culminated in the social sciences being dominated by the determinists, the three main determinisms being Psychological, Sociological and Chemical/genetic, the former two being predominant and favouring Behaviourism over Structuralism. Structuralism focuses on the very basic elements of consciousness through introspection. In a way Jaques extends this process of analysis by examining the meaning of words down to their Indo-European roots, and then links various actions such as trust and troth to these basic concepts. Behaviourism assumes these elements of consciousness to be pretty much consistent throughout humankind.

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[104] (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999)

[105] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002)

[106] Jaques refers to p14 of (Bickerton, 1995): “… develops his formulation around a broad definition of communication as conveying information about conditions, states, feelings, and common actions, whereas language conveys information about knowledge, or as he puts it even more succinctly, the difference between conveying “what-I-want” and conveying “what-I-know”.

[107] Please see Chapter 4

for further definition.

Whereas Jaques' earlier work seemed to follow the psychological and sociological behaviourism, the bulk of his work can be categorized as Structuralism and finally culminated in his own form of determinism, which I have name Jaquian Determinism. Jaquian Determinism differs from Chemical/genetic determinism only in that the latter posits a chemically based autopoeisis while the former posits a logic based autopoeisis.

Chapter 3

Managerial Authority, Accountability and Work

We are not all capable of everything.

Virgil's Aneid, viii.63

3.1 Hierarchy as the foundation for Requisite Organization

Requisite Organization purports to be "total managerial system"[108] built on four pillars, all interacting and integrating with each other so as to enable organizations, be they in the private or public sectors, local or global, to achieve their goals and objectives with efficiency.

This is achieved by structuring the organizations in a manner that fits people into roles that they are capable of, reducing the stress caused by the environment and in so doing releases the human potential of its incumbents[109], improves their mental well being and ultimately that of society at large.

The first two pillars pertain to the organizational structure and the managerial and leadership processes in the structure, followed by systems for evaluating human potential so as to place the correct people in the correct roles and to then reward them commensurate to their capabilities and size of the roles they perform.

Jaques relates an event in which a person asked the question as to why labourers were paid hourly or weekly and managers monthly as being that which led him into arriving at his method of measuring work, i.e. time-span of discretion. Jaques explored the relationship between work, pay and time and in the process wrote the books "Measurement of

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[108] (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999)

[109] In chapter 14 of (Jaques, 1990) Jaques deals with the relationship between anxiety the capacity of individuals to work.

Responsibility”[110], “Equitable Payment”, “Time-Span Handbook”[111], “A General Theory of Bureaucracy”[112], culminating in “The Form of Time”[113].

If one considers that there is a natural hierarchy in all organizations in terms of the duration periods of remuneration, i.e. labours are paid either hourly or weekly, depending on the length of time their labour will be required, managers monthly and executives and directors annually through performance bonuses based on their performance over the past year and share options based on multiple years, then the corollary must mean that there is a time span to the work they do that fits the remuneration method.

His research at The Glacier in the mid fifties led him to the following results[114] as presented in table 2.1 below:

MAX. TIME SPAN —	1hr	1day	1wk	1mth	1yr	2yrs	5yrs	10yrs
ANNUAL WAGE OR SALARY (APRIL 1954) —	425	475	550	650	1,000	2,000	4,000	8,000
ANNUAL WAGE OR SALARY (APRIL 1955) —	450	500	600	725	1,150	2,300	4,500	9,000

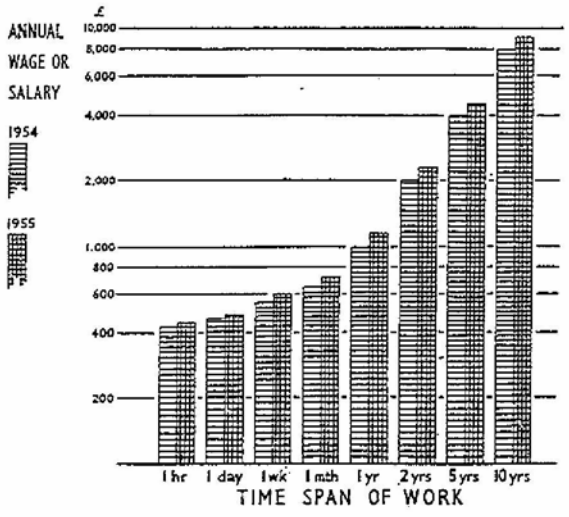

Table 2.1

During the five years that followed, Jaques and others, collaboratively and independently, “observed regular and universally occurring underlying structure of levels of organization, a universal pattern of stratification.”[115] These patterns kept showing up when the time-spans

[110] (Jaques, Measurement of Responsibility: a study of work, payment and individual capacity, 1956)

[111] (Jaques, Time-Span Handbook, the use of time-span of discretion to measure the level of work in employment roles and to arrange an equitable payment structure., 1964)

[112] (Jaques, A General Theory of Bureaucracy, , 1976)

[113] (Jaques, The Form of Time, , 1982)

[114] (Jaques, Measurement of Responsibility: a study of work, payment and individual capacity, 1956) , p 53.

[115] (Jaques, Creativity and Work, 1990) p 45. Here Jacques cites the work of Evans, J. S. (1979), *Management of Human Capacity*. Bradford, UK MCB Books; Rowbottom, R.W., & Billis,D. (1978), Stratification of

were “measured by the tasks with the longest target times for completion which can be found in a given role.”[116] Furthermore, the longer the time-span, the longer the timeframe in which the work took place and the greater the complexity of the work involved. It also displayed an optimum distribution of management levels as presented in the table 2.2[117] below:

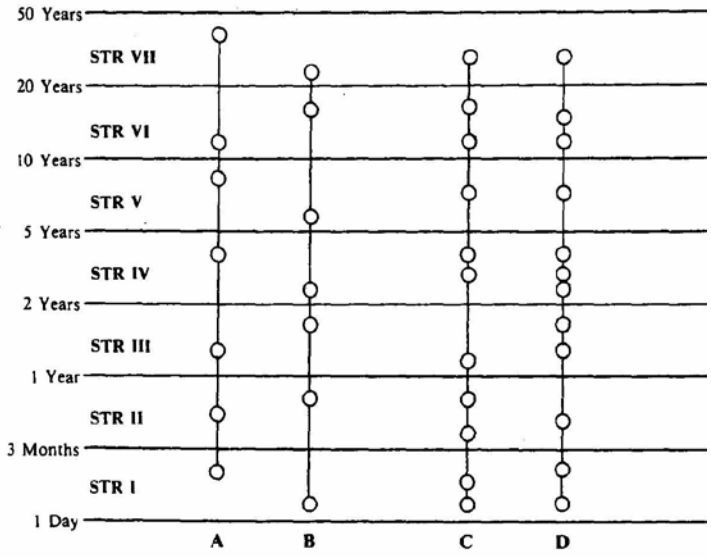

Table 2.2

In this table the “A” and “B” lines of manager distribution demonstrate a finding that there is an optimum manager-subordinate structure, in which managers always operate at a time span level higher than their subordinates. When situations as represented by lines “C” and “D” occur, the manager lowest in the same strata will treat his immediate manager as his supervisor but use the manager in the next strata as his real boss.

The structure was hierarchical, and this lead to Jaques becoming increasingly interested in hierarchies in general.

3.2 What is work really?

Jaques states that human beings are continuously engaged in either one of two major all-inclusive categories of activity, be it purposeful activity as expressed as goal-directed behaviour or “free-floating musing, reverie, and dreaming, without immediate goals.”[118] For Jaques work refers to all goal-directed activity, including games, as they all have a goal to which a player strives, and the following definition is instructive:

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work and organisational design. In: *Levels of Abstraction in Logic and Human Action*, ed. E. Jaques, R. O. Gibson, & D. J. Isaac. London: Heinemann Educational Books Ltd.,

[116] (Jaques, Creativity and Work, 1990), p 46.

[117] (Jaques, Creativity and Work, 1990), p 47.

[118] Ibid p 49.

> *Work:* the exercise of judgment (discretion) in order to reach a goal, always within limits and always with a maximum targeted completion time.[119]

If we unpack this definition, "reaching the goal" is the task at hand, the "what-by-when," but the actual work, the effort as it were, is the exercise of judgement and discretion. Jaques differentiates between adherences to limits[120] and exercising judgement; only the ineffable unconscious cognitive processes which manifests in observable choices is considered to be exercising judgement.[121] This sounds remarkably similar to Weick's sensemaking properties as epitomized by the sentence "*how can I know what I think until I see what I say*"[122]. Jaques states it differently as "*When you take all non-verbal judgment out of a decision it becomes a calculation and not a decision."*[123] In other words if you can say how arrive at the decision, as opposed to retrospective justification, there is no judgement exercised.

Does this mean that Jaques' judgement, Polanyi's Tacit knowledge, Maasdorp's Wellspring and Weick's Sensemaking are all one and the same thing?

3.3 Judgement, Tacit Knowledge, Wellspring or Sensemaking?

Intuitively they all look and sound very similar, but are they really? I do not intend to do an in depth analysis here as I believe that could be a thesis on its own, but I believe that a brief comparison would be instructive.

Jaques states the following:

> The mental processes involved in work are unconscious. They are mental processes at the pre-conceptual stage - pre-conceptual thinking as opposed to conceptual thinking. It is thinking which uses unconscious preconceptions (as described by Bion, 1962) rather than conscious conceptions. It is therefore unverbalizable, and because of that, it cannot be taught by direct formulated communication. It is the kind of experience ordinarily communicated by apprenticeship techniques – whether in manual work, or

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[119] Ibid

[120] Ibid p 49 – limits refer to the objective laws, policies, rules, regulations, and established custom and practice, as well as the resources, within which the individual is constrained in exercising judgment: adherence to limits is a matter of knowing what is required, and, other than at the boundaries, is not a matter of judgment.

[121] Ibid p 50. (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999) pair 20

[122] (Weick, 1995) p 61

[123] (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999) pair 20

> law, or medicine, or teaching - in which we say to the student, "Watch what I do, and try to get the feel of it," or "1 wouldn't have done it that way, I would have done it this way.[124]

Polanyi writes about tacit knowledge as follows:

> We must conclude that the paradigmatic case of scientific knowledge, in which all faculties that are necessary for finding and holding scientific knowledge are fully developed, is the knowledge of approaching discovery.
>
> To hold such knowledge is an act deeply committed to the conviction that there is something there to be discovered. It is personal, in the sense of involving the personality of him who holds it, and also in the sense of being, as a rule, solitary; but there is no trace in it of self-indulgence. The discoverer is filled with a compelling sense of responsibility for the pursuit of a hidden truth, which demands his services for revealing it. His act of knowing exercises a personal judgement in relating evidence to an external reality, an aspect of which he is seeking to apprehend.[125]

It is the "personal judgement" that is used in the "act of knowing" which equates to Jaques' "mental processes at the pre-conceptual stage" and is that which "'we can know more than we can tell".[126] Both Jaques and Polanyi are talking about the same ineffable thing. Maasdorp refers to "the concept of tacit knowledge to signify the unstructured subjective realm that is the *wellspring* of individual creativity".[127] The word "wellspring" conjures up the vision as the starting point, the original manifestation, unseen, and unknown in origin. It is pre-conceptual in that it is located in a process that is not subject the individuals own conscious interrogation.

The question then arises if Jaques' "judgement" relates to Weick's sensemaking. Thelejane[128] bridges the two theories and "argues that organizational sensemaking is enriched in a requisitely structured organization"[129], which in essence is what Jaques claims Requisite Organization will do. Jaques claims that the hierarchical structure in Requisite Organization

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[124] (Jaques, Creativity and Work, 1990), p157. The reference is to: Bion, W. R. (1962), *Learning from Experience*. London: Heinemann Medical Books Ltd.

[125] (Polanyi, 1967), p 24 - 25.

[126] (Polanyi, 1967), p 4.

[127] (Maasdorp, 2004) p 10.

[128] (Thelejane, 2010)

[129] Ibid, see the summary page.

is a reflection of the levels of human capability, which once again is very similar to what Thelejane[130] says:

> Organization and sensemaking processes are cut from the same cloth as organizations impose a sense of order and clarity by simplification, connection and minimizing deviations. Sensemaking is a similar process of creating something tangible by filtering, framing and reconstructing the subjective. Organizations structure and are structured by sensemaking processes as retrospect, a key property of sensemaking, is a key component that leads to structure.

In Jaques view, the structure is created in terms of' "judgement", but as a manifestation of the different capabilities of different men and woman, as reflected by the time-span measurement. Weick's Sensemaking describes certain processes that take place in the conscious mind so as to be able categorize and explain what the preconscious has sublimely brought forth. It makes sense of Jaques' judgement retrospectively.

It was the capturing and transfer of these same "unconscious preconceptions" or "personal judgements" that Nonaka and Takeuchi attempted to convey in their book *The Knowledge-Creating Company*, but as Maasdorp, 2004 argued –

> …. that in the case of Polanyi, the concept of tacit knowledge primarily stands for the *structure* of knowing. The content of knowing is the product of the integrative structure and hence interwoven with the structure. Since this tacit structure underlies all knowing, it makes little sense to think of the phenomenon of tacit knowledge as content that could be converted into an explicit form. Furthermore, it will be shown that the notion of knowledge transfer between individuals (a fundamental assumption of mainstream knowledge management theory) cannot be grafted onto Polanyi's conception of knowledge as arising from the integration of subsidiary particulars.
>
> It will be shown that Nonaka did not employ the concept of tacit knowledge according to the original technical meaning of the concept as used by Polanyi. It will be argued that Nonaka employs the concept of tacit knowledge to

[130] Ibid, p 82

> signify the unstructured subjective realm that is the wellspring of individual creativity.[131]

Maasdorp argued that Nonaka was unable to demonstrate that he was transferring tacit knowledge as defined above and that the appearance of them being able to do so was more as the result of an epistemological shift. In actual fact, they demonstrated the transfer of the results of the creative act as opposed to the process of creation of the act.

The following example of social trans-generational permanency of learned behaviour from Maturana & Varela may be serve as further illustration of the finer point being addressed here:

> As part of the process of studying the macaque, the investigators left potatoes and corn on the beach. In this way, the monkeys, who normally inhabit the jungle next to the sea, went to the beach, where they were more visible. After a time, the macaques became more and more familiar with the sand, rocks, and sea. One of the observations made during these transformations was that a bright female, called Imo, one day discovered that she could wash potatoes in the water, thus cleaning off the sand, which made them unpleasant to eat. In a matter of days, the other macaques, especially the young ones, imitated Imo and were washing their potatoes.[132]

It is clear from the above instance that wellspring exists in primates other than homo sapiens, that it is individual (or personal) in that it originated in an individual and that the product, which in this case was the act of washing the potatoes, not the act that produces the product, was quickly disseminated, not only to all the members of this particular troop, "but in the space of a few months, this new behaviour extended to all the adjacent colonies."[133] They also observed that the older members were the last to adopt the new behaviour. This seems to imply that there may be a maturation process in the cognitive ability of macques, just as Jaques claims there is in humans, albeit along different paths.

Nonaka attempted to institutionalize that which also occurs naturally among primates in the wild, but as Maasdorp has demonstrated, he confuses the product with the production process.

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[131] (Maasdorp, 2004), p10.

[132] (Maturana HR, 1998), p200 -201.

[133] Ibid, p 201.

In light of the above, I would conclude that Jaques' Judgement, Polyani's Tacit Knowledge, Maasdorp's Wellspring and Weick's Sensemaking are different approaches to codify and name the same phenomenon. All of the above are seen as being ineffable processes, the product of which can be observed and desseminated, but not the process itself.

It may be useful at this point to examine Jaques "Interactive Work Functions of Total Organisms".[134]

3.4 Work as goal directed choice - Work as a means to life?

Jaques published his final book "The Life and Behaviour of living Organisms: a General Theory"[135] and in it he writes that it was only at the end of his life that he had come to "realize the absolutely fundamental importance of the concept of work in any understanding of the nature and meaning of life."[136] He was even more convinced that processes of decision and choice making are inscrutable and therefore cannot be described. The processes are inaccessible and therefore take on almost a mystical quality. But even though it is all of the above, Jaques held firm that "once we get our hands on an unequivocal definition of what work is"[137], a number of central issues regarding the nature of reality and epistemology[138] may be better understood.

Starting with the accepted model of the three psychological functions of emotion, conation and cognition, Jaques proposed the following set of work functions that would apply to all living organisms:

1. An information storehouse
2. A subsystem comprising three tightly interactive regions of needs, intentions, and goals
3. A constructed field of attention[139]

The interactions between these functions are illustrated in the diagram below:

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[134] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002),

[135] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002)

[136] Ibid p 17.

[137] Ibid p 18

[138] In this context, epistemology refers to knowing how we know.

[139] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002)

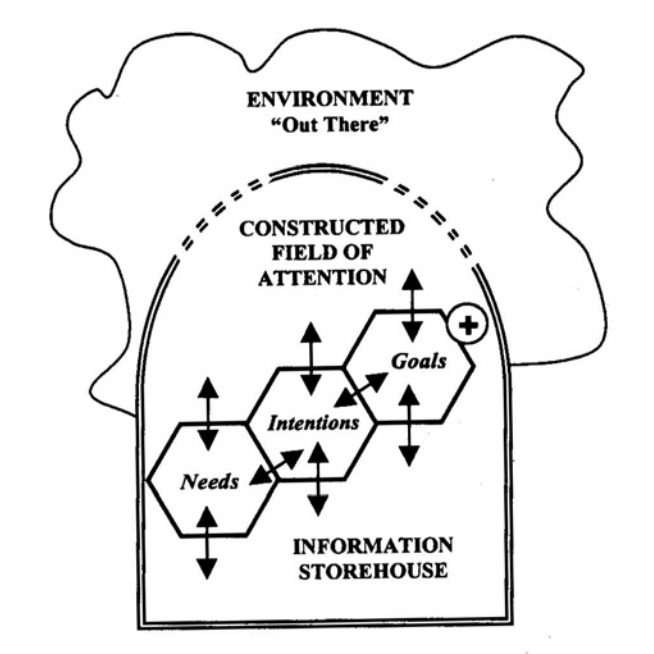

Figure 1. The Interactive Work Functions of Total organisms.

To live, all organisms need to expend energy of some sort to meet the immediate needs of their autopoiesis. At the most basic level, when the energy so used has to be replaced, the need triggers a process of interrogation/interaction internally between the contents (instincts, memory, etc.) in the Information Storehouse, which in turn generates intentions. Intentions co-ordinate what is observed in the Constructed Field of Attention and the relevant contents of the Information Storehouse, which in turn generates goals. Goals are then translated into activity, all the while coordinating elements from each of the three subsystems. The ineffable part of the process is the way in which the interaction between the different components take place, as the organism described here does not have language capability; all activity is pre-conscious. That does not necessarily mean the organism is not aware; it has to be or how else would it be able to realise it has a need, let alone realize its need. If it is aware of its need, it must also be aware of its environment.

Maturana describes a similar process in the following way:

> Living systems exist in two domains: one; the domain in which they exist as totalities or organisms, that is the domain in which they realize and conserve their identity as multicellular or unicellular singular beings, and two; the domain in which they operate as molecular autopoietic systems which is the domain of their realization as composite molecular entities. ….the behaviour that appears is not a feature of the

> organism, but a condition of its existence in the relational space in which it is a totality, and in which behaviour as a relational dynamics involves both the organism and the medium in which it exists.[140]

This is a statement loaded in favour of Jaques theories as described further down.

Jaques' illustration depicts these two domains quite clearly. The organism's awareness of its environment is through a constructed field of attention through which it participates in the "relational dynamics".

Maturana describes his first realization of this process towards the end of 1961 as follows:

> In conversation with my friend Dr. Guillermo Contreras I was highlighting a fact that we of course both knew, namely, that nucleic acids participate with proteins in the synthesis of proteins, and that proteins participate as enzymes with nucleic acids in the synthesis of nucleic acids, all together constituting a discrete circular dynamics supported by the continuous flow of the molecules that we usually call metabolites. As I was drawing a diagram of this circularity, I exclaimed "This is it!".[141]

He developed and expanded the theory and epistemology further and eventually began "to speak of living systems as closed molecular networks, and it was not until 1970 that I [chose] the word autopoiesis in order to connote the organization of living systems as closed networks of molecular production, and I could say that living systems existed only as long as their autopoietic organization was conserved."[142]

In the article Maturana is at pains to emphasize that the autopoietic life form and the environment in which it was conserving its life form was one total system and differed with Kant[143] & Kauffman[144] describing it as "that the parts exist for the whole and the whole for the parts."[145]

If one accepts Maturana's position that there is only one system with different parts, i.e. there is one universe comprising of humankind and the rest, and if they can describe the rest in terms of biology, mathematics and logic, and have to a large degree succeeded in and

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[140] (Maturana, 2002). Point 6 on p 4.
[141] Ibid p 1.
[142] Ibid, p 2.
[143] (Kant, 1952)
[144] (Kauffman, 1995)
[145] (Maturana, 2002) p 2.

continues to describe themselves biologically, why can they not describe themselves in a similar way using similar mathematical and logical constructs?

I will continue with this theme chapter 4 section 4.

It is useful to note that the circular synthesis process Maturana referred to above required an external energy source, i.e. “the composition and decomposition of the elements of this space (the molecules) occurs while these elements exist as composite entities under thermal agitation that operationally constitutes the energy for their composition and decomposition”[146], whereas autopoietic systems have to supply their own energy sources, in essence they have to “work” to live.

If for instance we observed a large tree as an example: during daytime it gathers moisture and nutrients through its root system in the soil, transports it up the stem and transpires the approximately 200 litres (for a big gum tree in summer), with the help of the sun, out through its leaves 10 to 15 meters above the ground into the atmosphere. The soil, the atmosphere and the sun constitute the molecular medium, the tree with its roots and leaves the autopoietic life-system, and all of them together, the total system, satisfy the structural conditions for the tree’s existence. Similarly the tree is sufficiently requisite to adapt to the different structural conditions that arise during the day, at night, in spring, in summer, in autumn and in winter . Should there be a drought and the soil dries out, the conditions are no longer satisfied and the tree dies.

The tree cannot loco mote, so its field of choices is limited to its immediate environment and the work it does is directed at a single goal, staying alive and reproducing itself by creating seeds.

The point is though, that even though the tree does not loco mote, it still “works”; ask a man to carry 200 litres of water up a 15 meter ladder and afterwards asked him if he has worked and he will definitely answer “yes.” In its “work” it overcomes the constraints placed upon it by its environment; I have only referred to one measurable constraint, gravity.

I believe that Jaques’ “The Interactive Work Functions of Total organisms” connects with Maturana’s concept very well and is therefore a valid departure point as he extends it to human beings.

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[146] (Maturana, 2002) p 5.

3.5 Jaques' Work as goal directed choice

Jaques introduces the concept of "work" with the sentence "that was a tough job doing the job they gave me to do in my job today!"[147]. The word "job" and "work" are easily interchangeable, but the point is that the sentence conveyed three different meanings for the same word. He found no clear definition for the word "work" in any of the literature, but noted that of the multiple faculties that psychology investigated, i.e. "perception, emotion, memory, thinking, learning, will, imagination, dreams, need, intention, and cognition (but no longer conation)"[148], none were being applied for a purpose or goal.

Using the sentence above, Jaques separated the different meanings in the following way. The first instance of the word "work" was defined as that which the person did, the second instance as the assignment, be it in the form of a task, project or program, and the third and last instance as the position or role the person occupies in a structure created for the purpose getting work done.

The word work is often confused with the physical work as in lifting a box or digging a trench. However there is a big difference when a mechanical lifter lifts a box and when a man lifts a box. The mechanical lifter does not constantly make adjustments to prevent the box from slipping or falling whereas the man will constantly be adjusting his weight, effort and balance, in short continuously making judgements and exercising discretion in the effort to lift the box all the while to prevent it from slipping or falling. The man has purpose when lifting the box, the machine only negates the force of gravity. Jaques differentiates between the two as mechanical work for the machine and "organical work[149]" for the man.

The "assignment" or task represents the goal to be achieved, not at any cost but within limits such as policies, law, rules and regulation budgets and a target completion time. A goal without a targeted completion time is an oxymoron. This does not mean that the completion time is cast in stone; it is adjustable as the initial intended and actual completion times almost always differ and that the intended time of completion is constantly assessed. To be able to accommodate the two time spans Jaques felt the need to move to what he terms as "5-D concept of the world, three spatial and two temporal, in dealing with living processes."[150] The

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[147] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002) p 18

[148] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002), p19.

[149] Ibid p 20

[150] Ibid p 20, I will discuss this construct later in the chapter.

assignment or goal is always a "what-by-when".[151] Jaques borrows from the formula for mechanical as W = F x S and defines organical work as W = J x T, i.e. Work = exertion of judgement through time and can be depicted as in the diagram below:

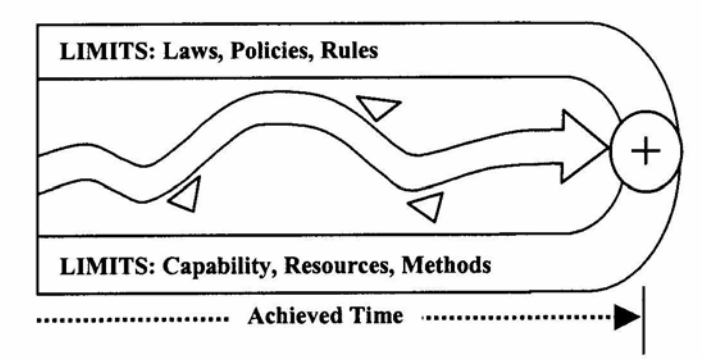

Figure 2. Judgement & decisions within limits over time.

The final use of the word "work" as translated by "role" is more difficult to define. As Weick expresses it, "anyone sense-maker is, in Mead's words, "a parliament of selves.""[152] We all play a number of different roles at different times in our daily lives. In this sense Jaques however refers to the role as created in the hierarchy. These will be determined later in the chapter.

3.6 The Goal-Directed or Purposeful Episode

The question arises as to how "purposeful" is purposeful behaviour? As from the reference to "a parliament of selves" above, for every person there is any given number of roles clamouring for attention; so how do you understand that which makes you give attention to one and not the other?

As Jaques explains:

> I was engaged for an extended period in World War II as a psychologist in an assessment centre, evaluating potential officer candidates. Those with IQs above 160 tended to receive low ratings on most of the other exercises which constituted the two-and-a-half-day program and those with such high IQs who happened to be selected and trained as officers were not necessarily outstanding. In like vein, the members of MENSA, the society whose members all have IQs of 160 or higher, are

[151] Ibid 21.

[152] (Weick, 1995) p 18.

> not outstandingly present in the higher levels of science, management, the arts, business or other areas in adult life.[153]

The story of the race between the tortoise and the hare springs to mind. To get to grips with work as goal-directed behaviour in more detail, Jaques used the psychological concept of the episode construct to analyse the same. He states his reasons as follows:

> Behaviour comes in temporal episodes. Episodes are abstractions from the space-time continuum, in the same way that physical things are abstractions. They are the fundamental things which we can study and observe in the human sciences. They are the basic building blocks for those sciences. They are as real as the material objects, substances, and atomic and subatomic particles of the natural sciences. A behavioural episode is tangible, encompassable, definable, observable, describable, just as is any event or process in physics or chemistry. Any completed episode is bounded by two recordable points on the temporal axis of succession. And during the episode there occurs a continuous changing of the structure and content-the patterning-of the unconscious field of memory-perception-intention of the participants as mapped along the temporal axis of intention.[154]

Jaques determined that a goal-directed episode had the following characteristics:

> A goal-directed episode begins with a person with a sense of something particular which must be done. ….
>
> However the episode begins, whether from some intake of an external stimulus or from an internal arousal, the individual experiences a need, or lack, in the sense of an episode to be traversed, a goal to be reached, an event to be completed. ….
>
> This sense of lack next begins to take shape as a *desire*-. …
>
> This something at the initial stage of desiring is a *goal image*.…
>
> Out of this goal image, orientational and exploratory behaviour begins, ….
>
> This plan must have as one of its components, if it is to be a realistic plan, the availability of resource objects; ….

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[153] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002), p 27 & 28.

[154] (Jaques, The Form of Time, , 1982), p 111.

> The remaining problem is to traverse the path which has been planned toward the attainment of the goal object, overcoming such obstacles - expected or unexpected - as may appear on the way, until the goal object is created or otherwise obtained, the lack fulfilled, and the end state of quiescence achieved; or else the goal object is modified - or else it is abandoned and failure is experienced.[155]

Jaques uses these characteristics as a basis to demonstrate the two dimensionality of our perceptual organization of time into a two axis form of time, one being the temporal axis of intention, which changes as we adjust target dates to compensate for the unexpected and a time axis of succession along which we measure our progress. I will continue with this theme in the next chapter.

3.7 Summary

In this chapter we explored how Jaques discovered a natural hierarchy in organizations as emerging from the way staff are rewarded in terms of length of time, or time-span, needed to complete the longest task assigned to the job. This led to an analysis of the temporal horizon of the incumbents and to then further define "work" as the exercise of judgment (discretion) in order to reach a goal, always within limits and always with a maximum targeted completion time.

As this sounds remarkably similar to Weick's sensemaking as epitomized by the sentence "how can I know what I think until I see what I say", I compared judgement, tacit knowledge, wellspring and sensemaking and found them to represent the same slippery phenomenon. Jaques posits all work as goal directed choice as a means to life for all life on the planet and I then explained Maturana and Varela's concept of autopoeisis, this being that the molecular processes on either side of the barrier must be the same, and found Jaques' model to be the structurally equivalent, albeit in a different realm of existence.

I ended the chapter by looking at how Jaques uses the goal-directed or purposeful episode as the starting point in his analysis.

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[155] (Jaques, The Form of Time, , 1982), p 112 – 113.

Chapter 4

The Role of Time – Time-span of Discretion

Time does not do things … it refers to a positional idea, a way of ordering.[156]

… that time past, time present, and time future, exist not just in the mind of man but as the essence of the mind of man, in the form of the interaction of memory, perception, and anticipation or desire, which enables' each one to pursue his life's aims.[157]

Episodes as described in the previous pages occur in a time of succession, along which we can take readings at various stages to determine our progress. This is the type of time the Greeks used the word *chronos* to refer to. But when we are preoccupied with overcoming obstacles, the structure of time in our minds contains memory (past experiences) perception of the situation at hand (the present, not seen as the time registered on the clock but as a continuum) and the desired goal (future) all at the same time. The Greeks referred to this as Kairos, and in this all three aspects are actively engaged in our minds at every point in the process, but as they are constantly changing, the goal is also changing.

Jaques explains it in this way:

> Time of succession is a series of time readings - it does not have direction in the space-time manifold. It has no past or future. It is a series of static abstractions of points in time. In time of succession there is no past, and no future, and no significant meaning to the present. It can be socialized, in the sense of being expressed in symbolic form of clock time, and the clock readings shared with others.

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[156] (Jaques, The Form of Time, , 1982), p 32.

[157] (Jaques, The Form of Time, , 1982), p 4 – 5.

> Past, present, and future by contrast are conditions of mind of [P] as he pursues his aspirations (future), using his memories of experience (past), and his perceptions of both inner and outer world (present). Past, present, and future are all simultaneously and continuously together as one integrated field in his mind as he orients and implements in the course of this episode. They constitute the changing content of the person's outlook mapped onto the temporal axis of intention.[158]

To illustrate this concept, Jaques started with a mode of construction developed by Kurt Lewin[159] and created the following diagram[160] as reproduced in Figure 2 below.

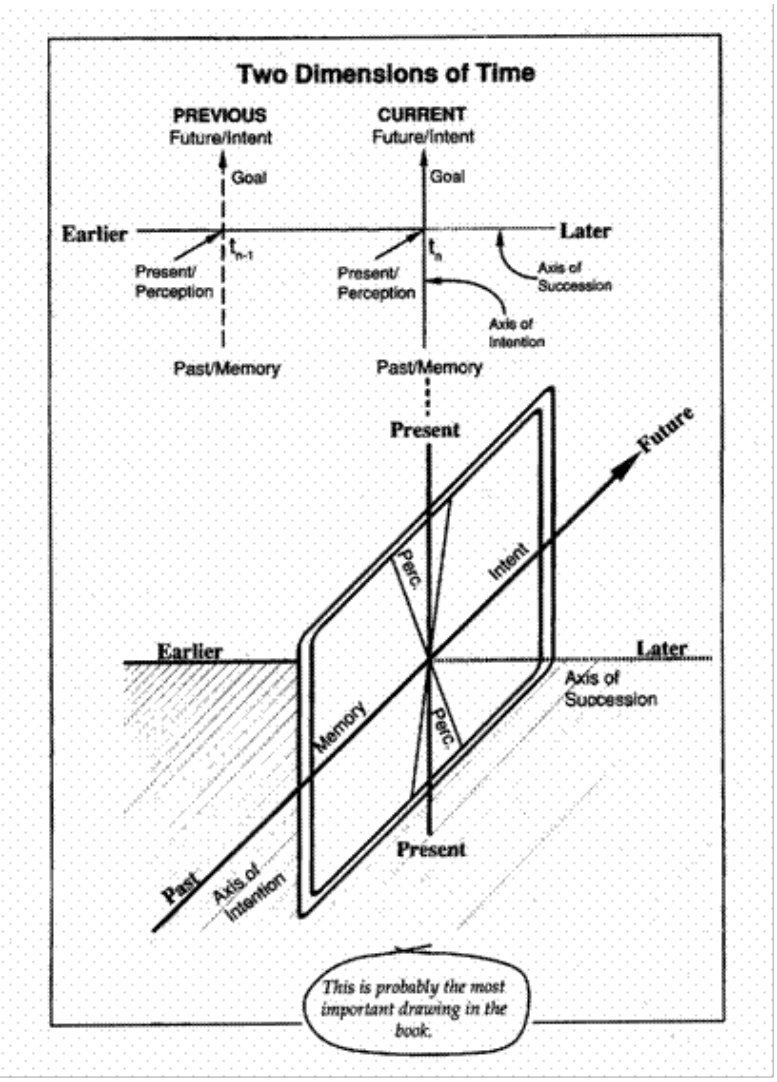

Figure 4.1 - Life-space represented as a section across the axis of succession.

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[158] (Jaques, The Form of Time, , 1982), p121 & 122.

[159] (Lewin, A Dynamic Theory of Personality, 1935)

[160] (Jaques, Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century, 2nd edition amended , 1999), pair 137

In the diagram time moves chronologically from left to right on the axis of succession, from earlier to later. The top section represents time in a 4-dimensional world, i.e. one dimension of time and three dimensions of space, and represents the progression of states of Future/Intent at point t_{n-1} and t_n on the axis termed Earlier – Later. The bottom section represents time in Jaques' 5-dimensional world, i.e. two dimensions of time and three dimensions of space. In this bottom section one of the indefinite number of cross sections of the time of intention that can be taken as snapshots along this axis, in this particular case at a particular point in chronological time t_n is shown. The slice along the axis of intention is an adaptation of the life-space diagram as proposed by Kurt Lewin[161] to demonstrate the state of an individual at any given point in time, and sits at right angles to the axis of succession. In this space you move along the axis of intention from the past, which now forms part of memory, to the present, that you are perceiving at t_n, to intent, which is the anticipated future. The slice is further divided into an upper half, depicting the "internal world" regions and the lower half depicting "external world" regions. The hour glass shaped area marked "Perc." denotes the "the inner region of active memory, perception, and anticipation, related to the particular goal-directed episode being considered."[162] Past, present, and future all occur at the same point in time t_n and together give the direction of intentionality. This intentionality underpins the "work" done in pursuit of maintaining the integrity of the autopeotic processes.

In terms of Lewin there are many further subdivisions in each of the regions are that are not depicted here, i.e. immediate perception and desire, the inner psychological world of ideas and desires, outer world of things and events, memories of events and experiences located in the psychological past, internal world memories of events, thoughts, ideas, and conflicts, and of events perceived and remembered as occurring in the outside world etc.

4.1 Time-span as a measure of capability

Jaques' purpose in this was to create an instrument with which to objectively quantify assigned tasks in work measured in terms of time. All tasks have a targeted completion time and an actual completion time. Moreover, as observed in table 2.1, the different levels in hierarchical organizations could be mapped to equivalent time spans as measured by the

[161] (Lewin, A Dynamic Theory of Personality, 1935), p 246

[162] (Jaques, The Form of Time, , 1982), p 97.

longest period of time that the individual tasks and assignments of a role needed to reach completion within required standards.

By mapping these targeted time-spans on to the axis of intention, Jaques created a standard of measure, called the *time-span of discretion*[163] against which the actual performance, which he termed the *time-span of achievement*[164] could be compared.

This construct looks as if it could be the basis for Henry Gantt[165]'s Gantt chart, a modern variation of which is still in use today as the Program Evaluation and Review Technique or PERT. Gantt charts displays the start and expected completion dates of various elements of a project and since the advent of computers and project management packages, are widely used to track performance relative to projected completion date.

What Jaques had now done was create a theoretical foundation based on the accepted psychological theory of episodes for a praxis that was and still is widely used and brings to mind the following from Joel Mokyr's book *The Lever of Riches*:

> As a general rule, it seems likely that in the past 150 years the majority of important inventions, from steel converters to cancer chemotherapy, from food canning to aspartame, have been used long before people understood why they worked, and systematic research in these areas was thus limited to ordered trial-and-error operations.[166]

Jaques now investigated if there was a way of relating the relationship between the size of the role and the size of the person occupying the role. He formulated it as follows:

> ….from the idea on the one hand that the felt weight of responsibility in a role can be measured by the maximum time-span of discretion in that role, to the idea on the other hand that a person's level of capability in work - the overall capability - can be measured in terms of the longest assigned time-span of discretion he is able actually to achieve, that is to say, of his maximum time-span of achievement. I shall refer to a person's time-frame in describing maximum time-span of achievement of which he is capable. My hypothesis then will be that the level or size of a person's capability in

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[163] Ibid p 128.

[164] Ibid

[165] Henry Laurence Gantt, A.B., M.E. (1861 – 23 November 1919). Gantt and FW Taylor worked together from 1887 to 1893.

[166] (Mokyr, 1990), p169 – 170.

> work can be defined by his time-frame. This time-frame is a reflection of the time-spans mapped onto the axis of succession for which he is capable of planning goal-directed episodes and of executing those plans and achieving the goals in the allotted time.[167]

It is the extent or size of the person's temporal domain that limits his temporal axis of intention which in turn determines the maximum time-span of intention the person is capable of. If one refers back to the observation on page 38 regarding persons with high IQ not being represented in the "higher levels of science, management, the arts, business or other areas,"[168] Jaques has shown that the attainment of goals is not only dependent on memory and recall. The individual with the high IQ but without the temporal domain to match is the equivalent of a high powered PC with insufficient RAM memory.

Jaques made some further observations that I believe may be insightful:

> A succession of events is not directional, it is not teleological. An intention, however, is both directional and teleological. It is the orientation of human intuition, the intentional process, which is directional and not time *per se*.[169]

Contrast the above with the following totally different way of understanding time as posited by Giddens:

> As the finitude of Dasein and as 'the infinity of the emergence of being from nothingness', time is perhaps the most enigmatic feature of human experience.[170]

This serves as an illustration as to why Jaques contended that the difficulties experienced by the philosophers with time were precisely because they focussed on either *chronos* time or on *duree*, and because they could not combine the two; this resulted in past, present and future being in separate dimensions.

4.2 Intention, Meaning and Goals

Jaques holds further that it is intention that creates meaning. We mean by what we intend. But what about the meaning we give to events and objects? What we intend is projected not only into the present and future, but reliant on the past as well. The word meaning is a bit like

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[167] (Jaques, The Form of Time, , 1982), p 128

[168] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002), p 27 & 28.

[169] (Jaques, The Form of Time, , 1982), p 100.

[170] (Giddens, 1984), p 34.

the word work; we “mean” to do, but it also “means” to us and others. The classic example of Searle’s Chinese Room[171] comes to mind. The Englishman in the room means to respond to the input in terms of the manual at his disposal, but is completely unaware of the meaning derived from his output by the Chinese man on the outside. It is in terms of this duality and the relational dynamics around us that we give and derive meaning. Meaning therefore is derived not only through our temporal domain, but by what we do and what we remember as well.

We have yet to answer the question posed at the beginning of the section, i.e. in the “parliament of selves,” how do we choose who/what to give attention to? Jaques views it as follows:

> Moreover, the question of measuring time-frame and temporal domain will call for a further sharpening of the concept of goals. In particular it will be necessary to distinguish between the subjective fluidity of private personal goals and the objective formulation of publicly stated goals set in cooperation with others or even by contractual commitment. These distinctions will take us into a number of aspects of social responsibility and social commitment. [172]

Jaques reduces this to the drive to meet an organism’s needs in living world and as the organism’s complexity increases the formulation of and the goals themselves become more complex, ultimately resulting in a form of social responsibility in homo sapiens, which occurs naturally in all structurally coupled and group type relationships. In the process of satisfying of these needs, goals are formulated, the duration of which extend further than the present and into the future.

“In the form of time is to be found the form of living.”[173] It is what the input into the “constructed field of attention” from outside introduces that concentrates the focus and

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[171] The Chinese Room argument, devised by John Searle, is an argument against the possibility of true artificial intelligence. The argument centers on a thought experiment in which someone who knows only English sits alone in a room following English instructions for manipulating strings of Chinese characters, such that to those outside the room it appears as if someone in the room understands Chinese. The argument is intended to show that while suitably programmed computers may appear to converse in natural language, they are not capable of understanding language, even in principle. Searle argues that the thought experiment underscores the fact that computers merely use syntactic rules to manipulate symbol strings, but have no understanding of meaning or semantics. Searle's argument is a direct challenge to proponents of Artificial Intelligence, and the argument also has broad implications for functionalist and computational theories of meaning and of mind. As a result, there have been many critical replies to the argument.

[172] (Jaques, The Form of Time, , 1982) p 129

[173] Ibid p129

therefore the depth of the temporal horizon and the internal capacity to tolerate the ambiguity and vagueness of the long-term future that influences the level at which an individual organism is able to work and achieve their goals.

Jaques' research completes this theory on time and time-span with the discovery of a maturation process that enables him to create a method of accurately measuring the temporal domain of individuals at a given age. The size of the temporal domain can then be related to maturation patterns that have been established by empirical research, and so be able to predict the maturation path of the individual over time. This resembles Maturana and Varela's conceptualization and treatment of the "life cycle"[174] of unicellular and multicellular organisms. Below is a figure of their comparison of the size of multicellular organisms plotted against the time it takes for them to reach maturity. There is a clear relationship between size, time and maturity and thus Jaques' maturation pattern certainly has a biological precedent. The larger the organism, the longer the time it takes to each maturity. This rule of with regard to biological maturation may equally apply to the maturation of human capability.

[174] (Maturana HR, 1998) p 78 - 87

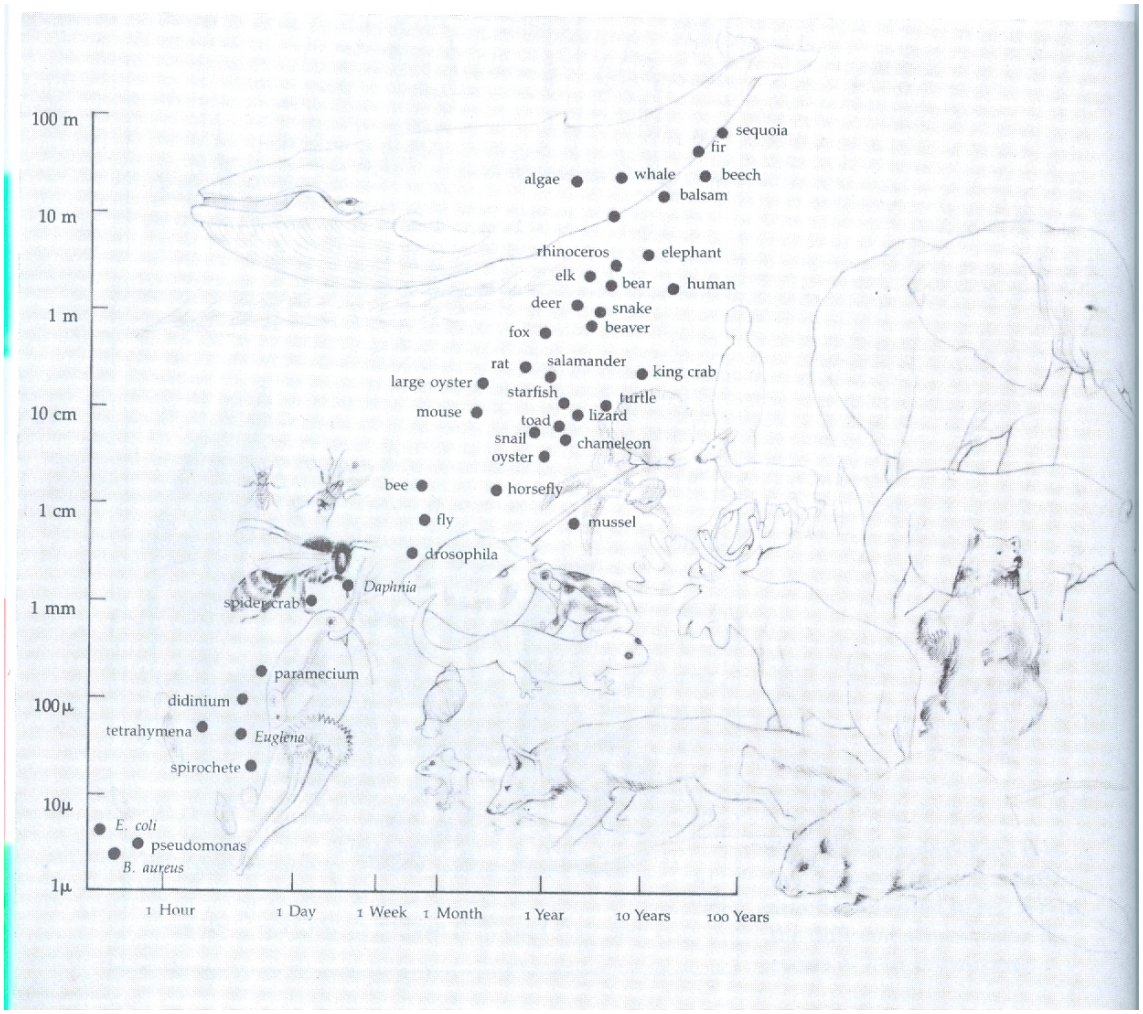

Figure 4.2 – Time of transformation into unicellular and metacellular organisms.

4.3 Kairos to Chronos

An important distinction that both Jaques and Maturana and Varela make is that although the organism matures (transforms) in a predictable manner over the extent of its life-cycle, its development may vary depending on its interactions with its environment. The latter of course points to the behaviourism or sociological determinism as posited by Skinner, but these interactions can be considered to be second order processes as created or emerging in terms of the underlying first order processes as proposed by Jaques.

It needs to be emphasized however that the timeframe observed does not relate to how far into the future or past a person can think, remember or imagine. It refers to the length of time that a person can “work” at achieving a goal, i.e. use discretion, and make judgements within prescribed limits in pursuit of a goal. Idle musing about events a hundred years in the past or the future is therefore not an indication of the size of a person’s temporal domain. As Jaques himself puts it:

> A person's time-frame is not how long into the future he happens to think or fantasize, or in the case of a child, how long it can aimlessly dawdle. It is concerned with specific, identifiable activities, with specific goals, with specific completion-time targets (even though those completion times might be changed during the course of the activity). It is what a person is able to actually plan for and to achieve and not just to wish for or to happen upon by accident.[175]

If one considers a new born baby, its needs to suck to meet its needs; in the very beginning it may continuously suck in episodes that last for a minute before pausing, and then once again starting a new episode of similar length. As the weeks go by, these episodes lengthen, and in terms of Jaques, it should be possible to determine the subject's potential temporal domain at two months of age various stages of its life. It is also important to note that Kurt Lewin's research showed that under conditions of frustration, there was a reduction in the time frame of young children.[176]

In later life this translates into the individual's ability to do meaningful work over discreet lengths of time. Any parent who has survived the adolescence of teenage children will attest to their generally limited view of their short-, medium-, and long term future. The short term is what they intend to do in the next half hour, medium term what they will be doing tonight and the long term what they will be doing on the weekend. These time-frames extend as the teenager matures into adulthood. So this is not a new concept. What is new however is that this maturation process starts at birth and continues through life until death. Jaques time-frame refers to an individual's overall capability of bearing responsibility to a greater or lesser degree when engaged in the doing things.

Jaques' findings led to the establishment of a variety of maturation patterns that reflect the process of maturation in size of temporal domain, measured in time-span, over time. These patterns start at a temporal domain size of about 2 seconds at birth and develop in size as the person grows older and start to decline from the age of fifty to sixty years. It is of interest that the higher up the scale the subject is, the later the decline in capability begins. The results can be seen in figure 4.3 below.

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[175] Ibid p 133

[176] R Barker, T. Dembo, and K. Lewin. (194l), "Frustratlon and Regression."

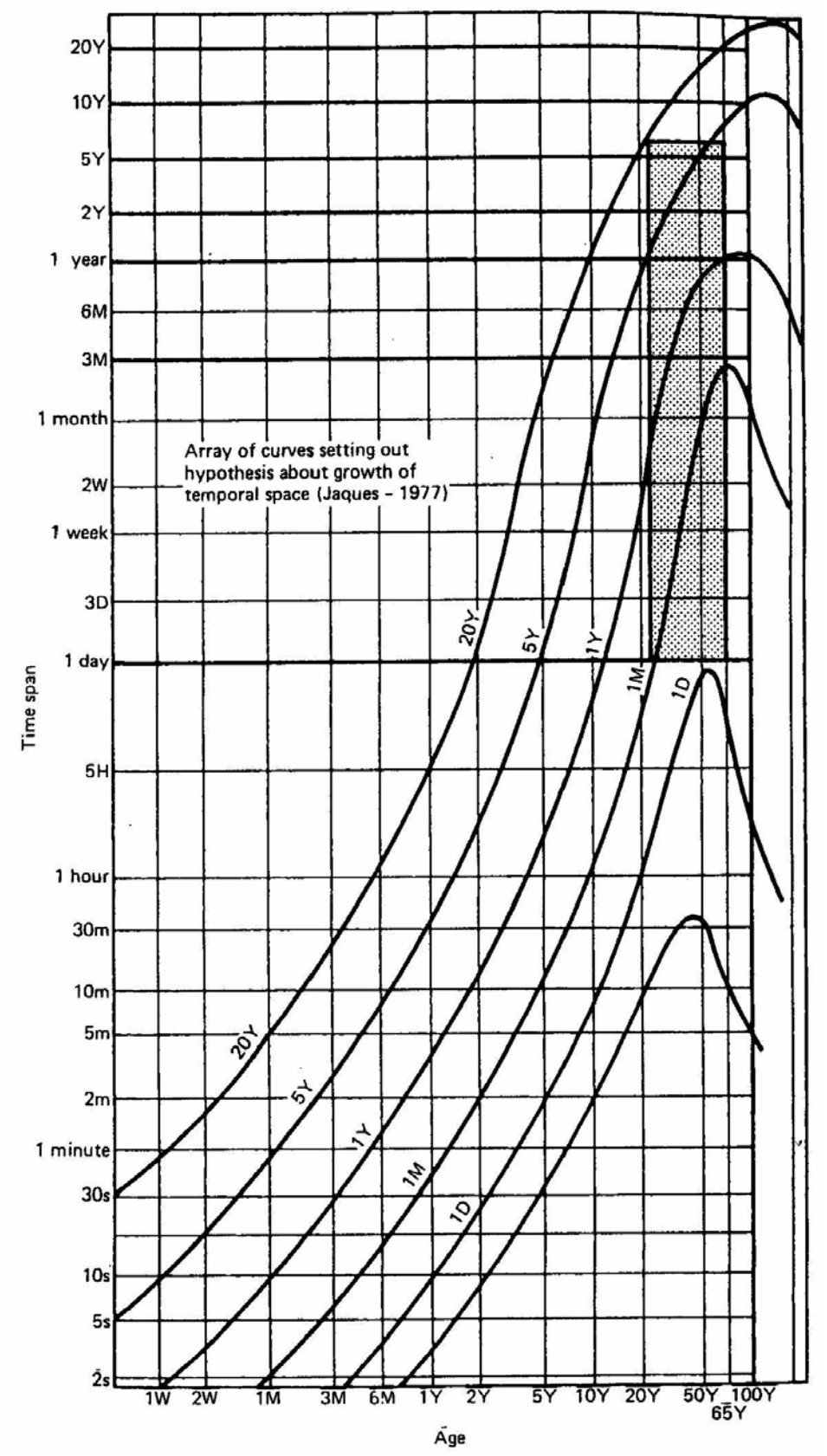

Figure 4.3 – Growth of time-frame in individuals[177]

[177] (Jaques, The Form of Time, , 1982), p 147

From this array of curves it is therefore possible to predict that that if at the age of five years a child has a timeframe of 1 hour, his maximum time frame between the ages of 50 and 65 will be 1 year. This implies, if one refers this back to table 2.1, that this child as an adult could be expected to occupy a position worth the equivalent of $ 1000,00 per month.

This ability to be able to measure any person's current and potential capability is what I refer to as Jaquian Determinism[178] and I will discuss this in more depth later. It is sociological anathema to the current Western milieu of Politically Correctness. But the research is there for all those who wish to see.

As his books are not that readily accessible, I have taken the liberty of quoting extensively below[179]:

> The first finding was that there is a strong tendency for the total wage and salary compensation of employed persons to follow a regular pattern when corrected to a common value by means of the national index of earnings so as to eliminate the effect of general increases which apply to everyone.[180] The rate of relative progress is by and large the same for everyone of the same age and earning level. The same general trend was found to hold for all types of employment in over twenty different countries.

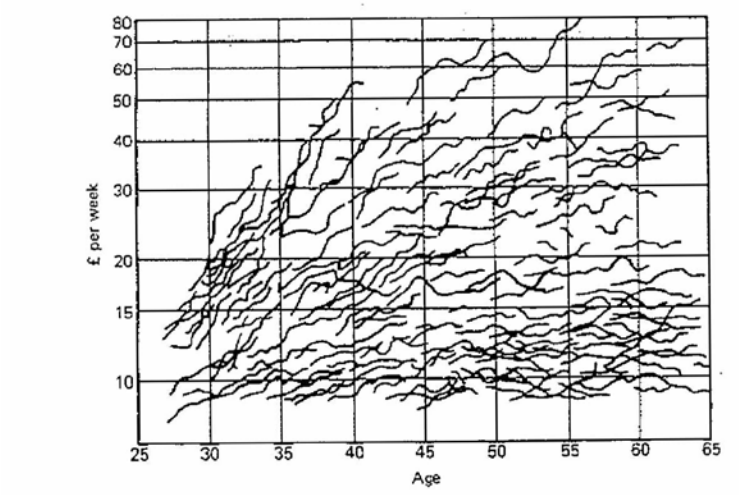

Diagram 9.2: Pattern of Individual Earning Professions.

Figure 4.4 – Growth in time-frame in individuals

[178] Because of the uniqueness of Jaques' work, I have chosen the term Jaquian Detereminism so as not to confuse the reader with any established determinisms.

[179] (Jaques, The Form of Time, , 1982), pages 146 to 150.

[180] Jaques' statement refers to a "normal" situation in which there are no external interventions enforced through political or legislative initiatives.

The general pattern of progression is as shown in [Figure 4.4]. In this diagram each curve is an earning progression for one person, corrected so that all movements, up or down, are movements *relative to* the movement of average earnings in the nation. The general trend of these curves-and note that they represent movements in individual earnings *through time*- was abstracted as shown in [Figure 7]. My preliminary hypothesis in so doing was that the explanation for the recurrence of the same general trend in so many different countries, under widely different economic conditions, was that the regularities in the pattern were an expression of the rate of growth of level of individual capability employed in work and of the concomitant rate of growth in economic reward.[181]

This preliminary hypothesis about growth of capability was then tested against individuals' expectations of growth in earnings. Here a very striking finding was obtained. The progression in earnings which individuals sought as a right for themselves followed closely one or other of the curves in [Figure 4.5]. Let me illustrate. If you ask any employed person what he feels would be a fair and just total compensation for a job that he would consider just right for his current capabilities, he will name a figure-say X,. If you then ask him to think of a job that would be just right for him in, say, five years' time, and to consider what total emolument (under constant economic conditions) he would anticipate as fair and just at that time, his reply-X.-will fall within ± 3 percent of the figure derived from extrapolating the curve on which XI fell. A number of these X_1-X_2 extrapolations are shown in [Figure 7].[182]

To get at the full significance of these regularities in people's expectations about reasonable progression in work and fair pay, it is necessary to recognize that the cumulative increases in what each individual would regard as a sound progression for himself in work level and related pay over these five-year periods range from 0 percent in the lower right-hand area-the older lower-pay group--to 60 percent or more in the upper left-hand area-the younger more rapidly rising group. These selfselected earning progressions are a financial expression of each individual's judgment of his own expected rate of growth in competence.

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[181] This hypothesis was first set out in *Equitable Payment*, chapters 9 and 10.

[182] These data were confirmed by Homa, who studied systematically the earning progression expectations of a population of 300 employees in six very different employment systems. Edna b. Homa, (1967), "*TheIinter-Relationship Among Payment and Capacity.*"

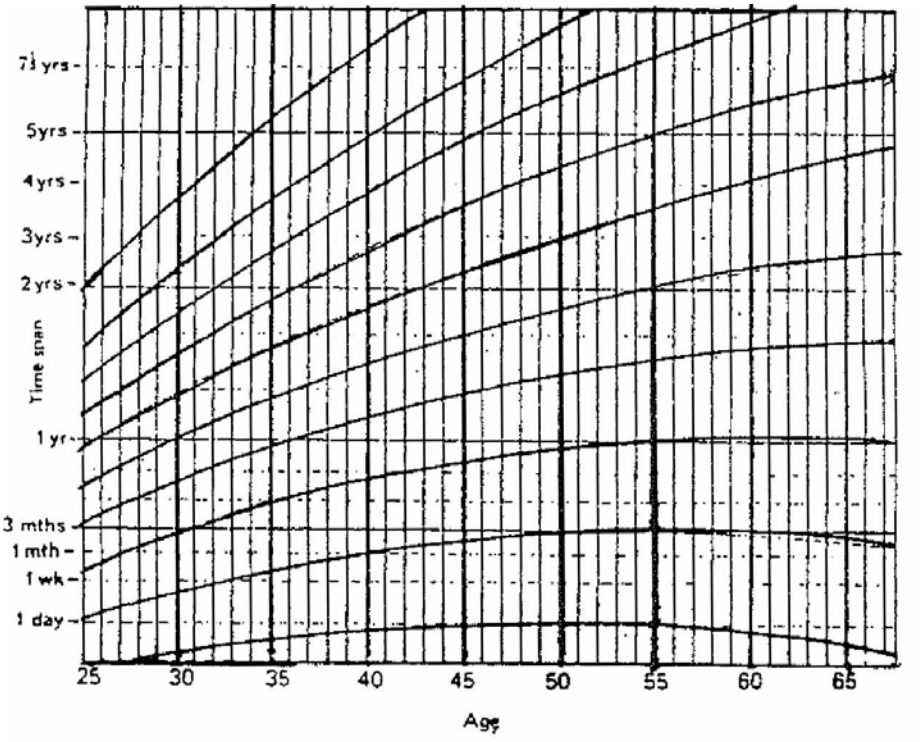

Figure 4.5 - Life-space represented as a section across the axis of succession.

> These judgments about progression in pay and competence have been checked against individuals' reactions to their actual progressions.
>
> I have followed the careers of nearly two hundred men and women for periods of 14 to 22 years. Whenever one of them felt he was being fairly remunerated and satisfactorily progressed, the progression of his remuneration, adjusted for changes in the national earnings index, followed one and the same time-frame progression curve. Deviations above or below this time-frame curve were experienced as times of overpayment or underpayment, of too rapid or of too slow progression.
>
> Most important for our purposes here, however, is the picture of a strong consistency in the rate of growth in a person's time-frame when the foregoing findings are translated into time.

The above findings enabled Jaques to formulate his “Felt Fair Play” theory which pointed to an intuitive ability of people to rate themselves against everybody else, to instinctively “know” or sense their own level in the pecking order of ability. This sensing takes place at a much higher level of logical intuition, as it were, than the pecking order arrived at in Bang *et*

al[183] in which the pecking order is determined through “aggressive interactions”. It is sense making in its purest form as they cannot even justify post the fact. The word “felt” aptly describes the manifest phenomenon.

This also reveals the ability of the individual to sense his or her level of competence in a given role. It implies not only the sensing of one’s own level of capacity, but that of another with the added ability of being able to rate it as higher or lower than your own. What faculties, what senses, what capabilities are brought into play in these processes?

The appreciation of music is another case in point. Human beings have been attuned to what is harmonious and what is not for millennia. It is only since the publication of Rameau's 'Traité de l'harmonie' (Treatise on Harmony)[184] in 1722 that the underlying logic was codified and abstracted as a theory, yet human beings have intuitively used music to all kinds of effects before then. Is this not another case of be able to respond to the logic “out there” intuitively because the logic on both sides of the barrier are the same? This will lead to the next important discovery made by Jaques and his team.

In an ideal world, our human hierarchies would be self ordering in terms of the above phenomenon, but it does not explain the emergence of the “Cain” syndrome, where the realization of one’s own level as being lower than that of another, leads to a paranoiagenic reaction, i.e. jealousy, and in Cain’s case, murder. Is it that there is a lower, more primordial sensory process that then takes precedence, and is this process indeed best explained by Melanie Klein or by Sigmund Freud?

With regard to Time-Span, Jaques believed that he had such a homomorphism that showed the quantifications in the table above satisfied the three fundamental conditions for the definition of magnitudes assigned to bodies[185]. After all, it is only the inclusion of a reference to a point of time in the future that converts an intention into an objective. In this way Jaques is able to convert the slippery elements found in the illusive realm of intention and meaning

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[183] (Alok Bang,Sujata Deshpande,Annagiri Sumana,Raghavendra Gadagkar, 2010).

[184] Rameau's 1722 *Treatise on Harmony* initiated a revolution in music theory.[47] Rameau posited the discovery of the "fundamental law" or what he referred to as the "fundamental bass" of all Western music. Rameau's methodology incorporated mathematics, commentary, analysis and a didacticism that was specifically intended to illuminate, scientifically, the structure and principles of music. He attempted to derive universal harmonic principles from natural causes.[48] Previous treatises on harmony had been purely practical; Rameau added a philosophical dimension,[49] and the composer quickly rose to prominence in France as the "Isaac Newton of Music."[50] His fame subsequently spread throughout all Europe, and his Treatise became the definitive authority on music theory, forming the foundation for instruction in western music that persists to this day. http://en.wikipedia.org/wiki/Rameau#Treatise_on_Harmony.2C_1722

[185] (Jaques, The Form of Time, , 1982), p 193:

into quantifiable entities, the properties of which can be measured and thus puts it on a scientific footing.

It can't be verbalized, but does that mean it can't be measured?

4.4 Can Work thus be Measured Accurately?

In this section I would like to pick up on a question posed at the end of Section 3.4, i.e. can we describe human psychology be means of mathematical and logical constructs?

In his article "The Form of Time: A Special Theory for the Human Sciences" [186] Dyer-Smith relates how Jaques showed an "early fascination with measurement"[187] as informed by (Bridgman, 1927). To Jaques the dearth of measurement instruments in the social sciences was a reason for it's not being treated as a true science and created a methodology of quantification that would satisfy the definition of measurement as set out in Krantz, D. *et al*[188] i.e. "as the existence of a well-defined homomorphism[189] between an empirical and a numerical relational structure. The properties of the empirical stucture must be shown to justify a numerical representation, and that proof constitutes a representational theorem. Extensive measurement yielding ratio scales is based on the homomorphism of the empirical structure of a set of elements with an ordering relation of some kind and additive concatenation, and the numerical structure of the positive real numbers, the relation of greater than, and numerical addition; that is to say, the homomorphism of (A, →, o) into (Re^{+},>, +)."

It is only properties of entities that can be measured. It thus follows that it is only entities ***with*** properties that can be measured that should be considered as real and thus form the basis of any epistomology.

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[186] (Dyer-Smith, 2006)

[187] Ibid p 341

[188] (Krantz, D., Luce, R., Suppes, P. , and Tversky, A., 1971) pp 9 -12 & 17 onwards.

[189] *Homomorphism*: (from Greek homoios morphe, "similar form"), a special correspondence between the members (elements) of two algebraic systems, such as two groups, two rings, or two fields. Two homomorphic systems have the same basic structure, and, while their elements and operations may appear entirely different, results on one system often apply as well to the other system. Thus, if a new system can be shown to be homomorphic to a known system, certain known features of one can be applied to the other, thereby simplifying the analysis of the new system. http://www.britannica.com/EBchecked/topic/270579/homomorphism

In chapter 11 of the *Form of Time* (Jaques, 1982) Jaques proposes a list of quantification methods as described in the table 2.3 below:[190]

Category	How quantified	Exemplary statements	Comment
Entity	Count	"This exists"	Entities exist and can be counted; words can exist for non-entities, e.g. unicorns, phlogiston
Property	Measure	"This is five meters long"	An entity cannot exist without measurable properties
Preference	Rate	"I like this very much"	Magic conflates preference and property, e.g. eternal life
Probability	Judge	"I think this likely"	Attitudes conflate preference and probability, e.g. optimism

Table 4.1

Most psychological testing focus on the bottom two categories, which is almost always an arbitrary measure as there is no universally accepted "zero" point. Two time-spans can either be added or subtracted from each other but you can't do the same for a rating or a judgement and still have a homomorphism.

4.5 Summary

Jaques' research into the nature and form of time led him to posit a two dimensional time frame, in which "time past, time present, and time future" or kairos time, are the underlying back ground to our intention, meaning and goals, whereas our chronos time is just a means of reference as milestones would be when measuring distance between to points, but are no indication of the topography covered.

The Time-span as a measure of capability[191] was further developed with the concepts of the time-span of discretion and the time-span of achievement. These he extended to the individuals "felt weight of responsibility" that linked to his capability to perform tasks requiring a particular timeframe. He showed how this capability is already evident at birth

[190] (Dyer-Smith, 2006), p 341

[191] Having an agricultural background, it has always intrigued me as to the divergence in terms of time or the timespan of different fields of agricultural production. I used to describe vegetable farming (from planting seed to harvest and sale, 3 -6 months) as short term, crop farming (from planting seed to harvest and sale, 6 months – 2 years) as medium term, and fruit/grape farming (from planting to replacement, ~25 years) as long term. It would be interesting to see if Jaques' theories apply equally in agriculture.

and that it matures (as opposed to develops) along predictable paths right up until old age and finally death. He showed with his concept of "*Felt Fair Play*" how individuals have the ability to rate themselves relative to each other.

With his concept "time-span" Jaques has discovered the only measurement in cognitive science and sensemaking that can claim to be a homomorphism.

Chapter 5

The Role of Logic in Human Action

"…reason, logic, and rationality are not solely the prerogative of the conscious mind, of conscious mental activity".

Jaques' path to a homomorphism with its ordering relations can be found in the book "*Levels of Abstraction in Logic and Human Action: A Theory of Discontinuity in the Structure of Mathematical Logic, Psychological Behavior and Social Organization*" (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978). The authors designed a discontinuity theory of psychological development in a system that consists of five distincts levels, which in turn comprises fifteen distinct modes of functioning in total.

At the outset it must be noted that Jaques had as ultimate purpose the following:

> I shall have to establish that *reason, logic, and rationality are not solely the prerogative of the conscious mind, of conscious mental activity*[192]. They are always the outcome of the interplay between conscious, preconscious, and unconscious mental activity in this sense: conscious mental activity sets the explicit articulated framework of behavior, including the context of knowledge within which we act; preconscious mental activity provides the background store of knowledge and awareness upon which we can consciously draw; and unconscious protomental activity provides the continuously shifting direction of intentionality, the sense of where we want to go, wish to go, will to go. This distinction contrasts sharply with more common usage which takes it that it is in the conscious processes that we find the reasonable, the logical, and the rational, as compared with unconscious mental activities which (if they are granted existence at all) are regarded as the seat of the illogical, of unreason, and of the irrational, or at best as the source of foolhardy rationalizations.

[192] My italics.

> My reason for bringing into my analysis these questions of the logical and the rational in relation to the conscious and the unconscious, is to pursue the following argument. Unconscious desires and goals are elements in rationality. Goals are intentions; therefore intentions can derive from unconscious proto mental sources and at the same time contribute rational action.[193]

In pursuit of the above, he follows a line of thought that if "qualitative changes may occur in the state of material things, … and that those changes may occur suddenly, continuous change in quantity may be accompanied at certain decisive points by discontinuity in state."[194] This concept has little traction in the social sciences or in any of the determinisms mentioned in Chapter 2. It is for this reason that the normal distribution curve is the most used quantitive expression in systematic studies in these fields. But this limits these studies to only one parameter.

5.1 Discontinuity in Psychological Development

Jaques cites a study done by Tolman[195] on rats solving a maze running problem as an example of this problem. The data indicated that two groups of rats emerged from the sample population, one group "seem[ed] to be using a higher level of abstraction in solving the maze-running problem". [196] The results of this study were interpreted in terms of only one parameter, i.e that there was a range of abilities, but did not explain the distinct discontinuity found in the quality of ability between the two groups.

Jaques relies heavily on the work of Paiget and other developmental psychologists[197]as the departure point for this work, in whose work discontinuity often characterizes the rate of change in the properties and various characteristics found in human individuals at different stages of development.

This book is a confluence of similar phenomena observed by different researchers in different fileds of study. John Isaac had observed discontinuities in the levels of abstraction capabilities as seen in science and mathematics students and as a result he and Roland Gibson had collaborated on a model of levels of abstraction observed in these same geometry

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[193] (Jaques, The Form of Time, , 1982), p 50-51.
[194] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978, p. 3).
[195] (Tolman, 1951).
[196] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), p 4.
[197] Ibid p 4.

students. They intially identified six such levels but later reduced the number to five. This seemed to be remarkably similar to the phenomenon Jaques had observed in the structure of the discrete levels he had found in the managerial structures reported on page 27. Further experimental work was done by Gibson and Brian O'Connor, and these results have been generalized through an analysis of the structure of mathematical logic. They showed the following "two connected hypotheses about discontinuity in psychological development showing up in two different types of multi-modality."[198]

The first was that "discontinuity in ability in problem-solving would manifest itself in the emergence with age of an increasing number of modes in the distribution of scores indicating level of performance - giving a series of discrete levels of ability, five in all," and the second that "not only would there be a series of discontinuous levels, but that a different mode of work *would* emerge with each level."[199] This experimentals work and the discontinuity theory it produced was then converted into truth table logic, using the bi-polar relationships and contrasts structure as found in psychology. It is this work that forms the basis of one of Jaques later books, *Human Capability*,[200] which he wrote with Kathryn Cason.

Once again starting with the relationship between a mother and a newborn baby as the initial state and in which the baby has had no prior experience of the world outside of the womb, it is assumed that a only state of "chaos, nothingness,"[201] exists for the baby and that it does not yet experience a "self" nor any "objects" separate from itself, but only "immanent needs."[202] These immediate needs are the only elements of its felt reality, as no person is born with a "prefabricated reality"[203] of the world it enters into. A this stage these are the only objects that form part of the child's "*umwelt*"[204] as brought forth by it's survival driven impulse to meet its immediate needs. The felt need gives rise to a duality, that which is needed and the act of needing, the latter giving rise to the "self" as separated from the former. It is at this point that the very first act of "structural coupling"[205] takes place, the coupling being based

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[198] Ibid, p 7.

[199] Ibid, p 7-8

[200] (Jaques, Elliott, and Cason, Kathryn, 1994)

[201] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), p 102.

[202] Ibid, p 101.

[203] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), p 100. Jaques' departure point is similar to that found in Werner, H. (1967); 'The concept of development from a comparative and organismic point of view'. In Harris, D. B. (Ed.); *The concept of development;* Minneapolis, University of Minnesota Press.

[204] Umwelt

[205] (Maturana HR, 1998)

on the sensual connection between the baby and the mother as it acts on the breast with the resultant satisfaction, or not, of the felt needs. If the felt needs are satisfied, this satisfaction is "discriminated out of the initial chaos", the identities "self and need" on the one hand and "breast and mother" on the other emerge as two poles with a relationship linking the two. In terms of mathematical logic, this state is represented as "true" relative to the needs being met. Should the need no longer be met, the discrimination fades and confusion/chaos with its accompanying anxiety returns and in terms of mathematical logic this state can be represented by "false" relative to the needs being met. The underlying relationship is then either discriminating or confusing, either "true" or "false." This relationship is aptly described in mathematical logic's most fundamental statement, i.e.

> primitive form of statement *P* –"'statement" in the sense of an actual response - and its "negation" *(NP).* 'Negation' and 'affirmation' are associated with behavioural entities and are thus seen as unconventional language, language as direct action.[206]

It must be emphasized that the ontegeny or history of the various states over time have no bearing on the underlying logic.

It is key to understand what Jaques is saying here. He separates the conscious from subconscious on the basis of articulated language with regard to the former, and action or connation with regard to the latter. He sums it up in the following way:

> Decisions are always goal-directed, since a choice can be made only in relation to an intended outcome. Moreover, deciding or choosing are always in the final analysis founded upon unconscious processes. The role of protomental unconscious factors in decision-making can be succinctly summed up in the fact that if you consciously know all the considerations that led to a particular choice then you did not make a decision: you were a computer.[207]

In terms of the baby's coupling with its mother, there is no conscious considerations in either the action or the reaction of the baby as it as yet has no other memory of previous couplings, let alone language, but the logical foundation is already embedded.

It is here where Jaques and the other determinists differ fundamentally. Jaquian determinism holds that while the initial state of each baby born may be the same blank sheet as it were, the

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[206] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), p 13.

[207] (Jaques, The Form of Time, , 1982), p 70

capability is already embedded and it will begin to follow a predictable maturation path, whereas the psychological and behavioural determinists hold that the person's capability is formed by the nature of the continuous structural coupling process as the person develops into maturity. Jaques however, believes he has a way in which he can describe an aspect of these unseen processes in a scientifically measurable manner.

5.2 Experimental Work – Levels of Abstraction

To enable Jaques and his team to construct a theory that would enable them to codify the above in a form that would enable quantitatve experimental data to be collected and analysed, they created a basic "dynamic element" that was used to create a structure that was capable of measuring the difference between the series of stages as the individual's capability progressed. The definition of the element is as follows:

> Relation discriminates[208] pole;
> Discrimination of pole leads to discrimination of relation;
> Discriminated relation discriminates other pole;
> Discrimination of this pole further discriminates relation; and so on. [209]

The element operates on a continuous basis by oscillating between poles through the relation, the poles always being equally distinguished or equally vague. Should a pole become totally indistinguishable, the relationship with the other pole disintegrates and becomes confused. This relates remarkably well to the term "cognitive dissonance", in which condition the person is unable to discriminate any recocnizable cues that can be used to construct a plausable field of operations.

From the above a "*System of Levels of Extension of Structure and Associated Modes of Functioning*"[210] was created as follows. Starting with the initial two poles linked by a relationship element, a set of five levels, each level containing all the elements of the former but with one more added to represent the increased complexity of the new level, was constructed so as to represent the various levels of psychological development a person matures to/through at a given age. In the first level, each object pole in the object field is related directly to the self pole with a single mode of functioning. Symbolicly the mode of functioning can be represented as

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[208] The word "discriminate" means to set up and distinguish.

[209] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), p 101

[210] Ibid, p 105.

S_1 operating; $S_1 \longleftarrow R_1 \longrightarrow O_1$

The level 1 structure is represented in figure 5.1 below:

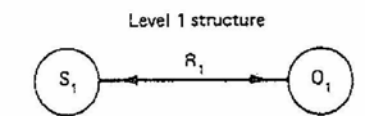

Figure 5. 1 [211]

In the second level, a second self pole enabling a more abstract self is added to the first level with additional complexity that effectively transforms the self and the object it relates to. The self pole now has the added ability of relating to the object in more than one way. The "mode of functioning" is similar but not identical.

The two different modes of functioning can be writen in the following symbolic way[212]:

1. S_2^1 operating; $S_2^1 \longleftarrow R_1 \longrightarrow O_2^1$

2. S_2^2 operating: $S_2^2 \longleftarrow R_2 \longrightarrow O_2^2$ or $(S_2^2 \longleftarrow R_1 \longrightarrow O_2^1) \longleftarrow R_2 \longrightarrow O_2^2$ since S_2^2 is the integrated unity $(S_2^1 \longleftarrow R_1 \longrightarrow O_2^1)$.

The level 2 structure is represented in figure 5.2 below:

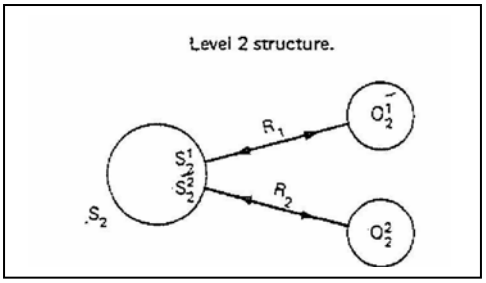

Figure 5. 2 [213]

Similarly the third level contains the two modes of functioning of level 2 with an additional level of complexity that transforms the self pole so as to now be able to relate to objects in its object fieldin a third way. The three different modes of functioning can be writen in the following symbolic way:[214]

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[211] Ibid, p 105.

[212] Ibid, p 106 – 107.

[213] Ibid, p 106.

[214] Ibid, p 106.

With the level 3 self comprising 3 components, any one of three different ways of functioning can operate in the satisfaction of the three associated needs. These three basically different ways are symbolized by R_1 R_2 and R_3. The modes of functioning are as follows:

1. S_3^1 operating: $S_3^1 \leftarrow R_1 \rightarrow O_3^1$

2. S_3^2 operating: $(S_3^1 \leftarrow R_1 \rightarrow O_3^1) \leftarrow R_2 \rightarrow O_3^2$

3. S_3^3 operating: $(S_3^1 \leftarrow R_1 \rightarrow O_3^1) \leftarrow R_3 \rightarrow (S_3^2 \leftarrow R_2 \rightarrow O_3^2)$

The level 3 structure is represented in figure 5.3 below:

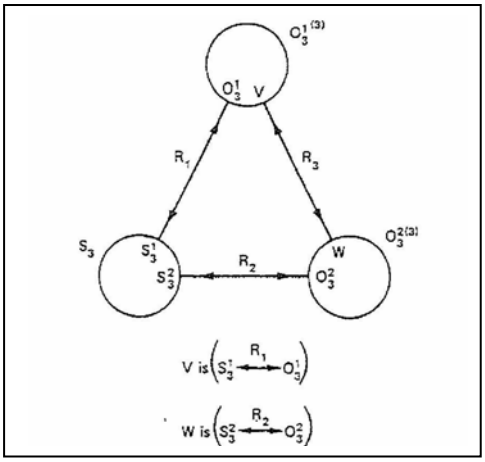

Figure 5. 3 [215]

This process continues with each next level being more complex than the next until level 5, in which a type of relation is added that enables the self to relate any object to any other object. In this level this structure is too complex to be represented graphically; however the writers represent the various levels of the theoretical modes of functioning using the symbols in fugure 5.4 below.

[215] Ibid, p 107.

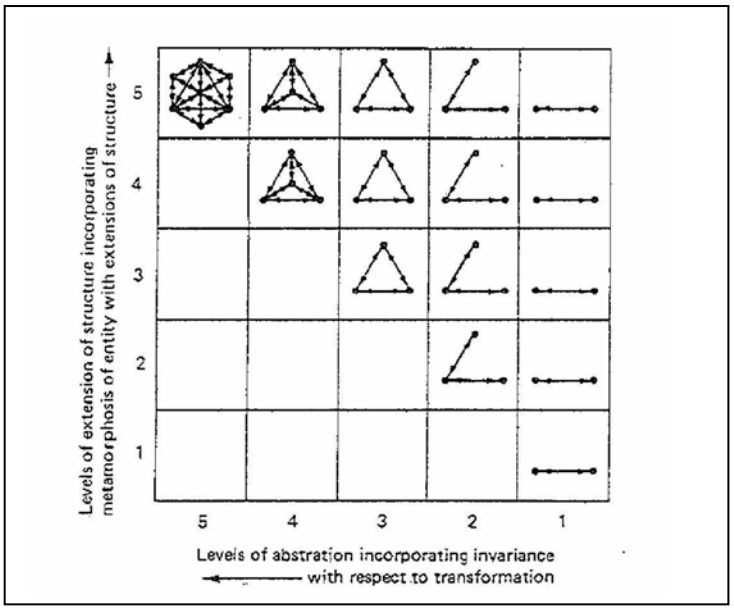

Figure 5. 4

The authors then created a series of problem-solving experiments that measured the subjects' performance based on the the basic mode of functioning that the subject employed in solving the problems, i.e. in a level two type problem, the subject could employ any one of two modes of behaving to solve the problem, in a level three type problem any one of three modes etc. An example of a typical problem is described as follows:

> The apparatus functions as follows. When a button is pressed, the associated light is illuminated immediately and stays alight for three seconds. At the end of the three-second period, the light goes out and the next light in the sequence goes on, and so on until the sequence is complete. Pressing a button anywhere in the sequence puts on the associated light, and, in turn, all successive ones.

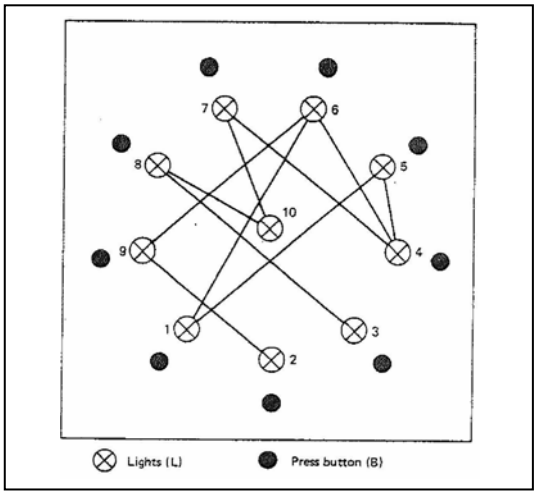

Figure 5. 4 Apparatus

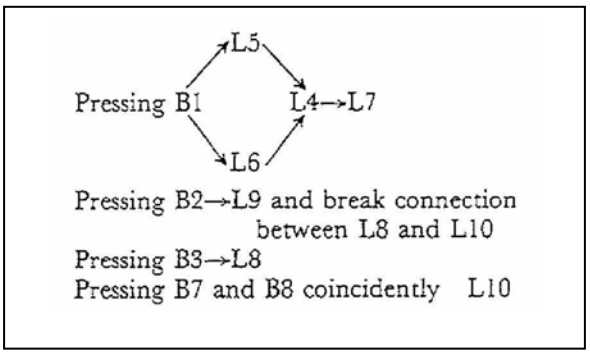

Figure 5. 5 Sequences

> *Problem.* To light centre light L10 five times successively using B I, B2, B3. (Initially any button may be used to find out how to solve the problem.)
>
> *Solution.* L10 comes alight after L7 and L8 are coincidently alight To obtain this, press B1, wait until L4 comes alight, then press B3. L3 and L4 will then be alight coincidently, followed by L 7 and L8 coincidently, foI1owed by 110. Pressing B2 is avoided, because in time L9 comes alight, during which time L I 0 is prevented from lighting.
>
> In this experiment, the time taken to solve the problem was measured and also the total number of button pressings counted. Neither of these parameters alone gives rise to a distribution with a well-defined structure. A scatter diagram was plotted with time along one axis and number of button pressings along the other (Figure 4.3), each point representing a subject's performance. It was noted that the points do not appear randomly distributed, but grouped in well-defined clusters. It was also noted that the gaps between clusters appear to lie roughly on arcs of circles of differing radii but with a common centre (at the origin).[216]

Different experiments were conducted for different age groups of subjects, 6 – 11 years, 12 – 16 years and 17 – 22 years of age. The results of the experiments confirmed that despite them being each group being subjected to dis-similar experiments, the "structures of the distributions were almost identical."[217] The subjects in each age range could not (with exceptions) solve problems in the next stage, whereas they could easily solve the problems for the lower levels. Each level presented a distribution curve with the same number of distinct peaks as modes of behaving, i.e. level two with two modes showed a histogram with two peaks, level three with two modes showed a histogram with three peaks, etc.

In addition to the above, loss of skill experiments, in which the rate of change in the object field was increased so as to determine the point at which the self was no longer able to descriminate and resultant chaos encreased, were also conducted. The results so abtained aso revealed similar characteristics. A combination of the various results are shown in conjunction with a model of the theoretical system in figure 5.7 below.

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[216] Ibid, p 46 - 47.

[217] Ibid, p 115.

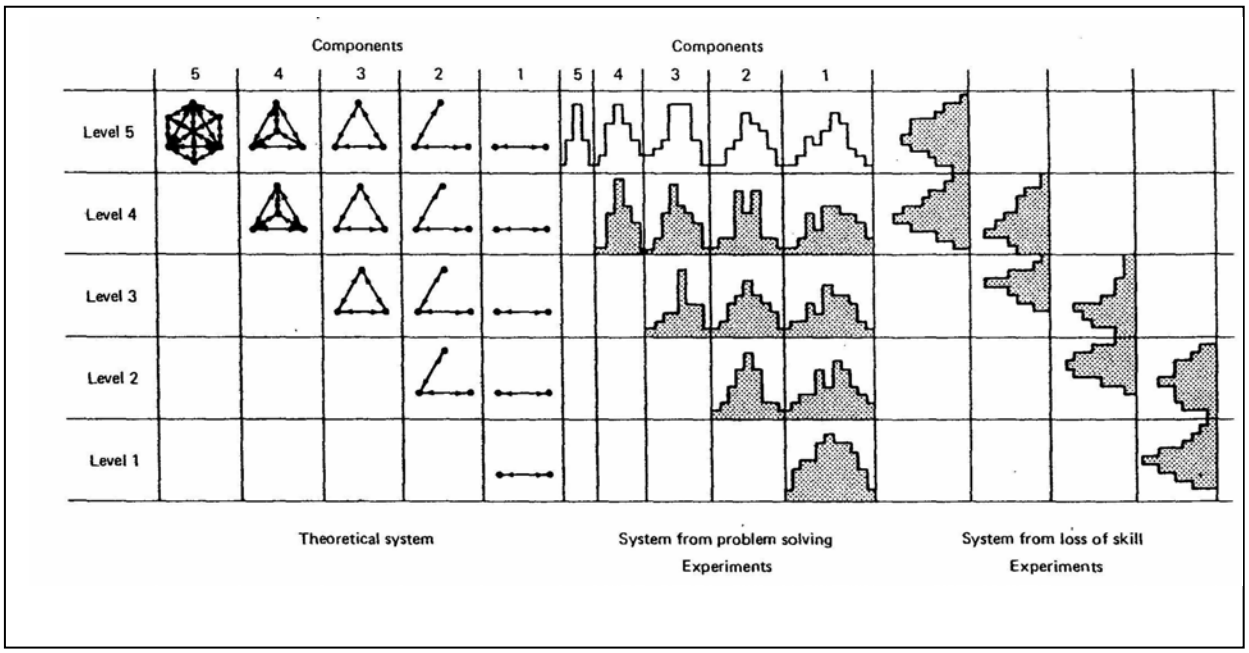

Figure 5. 6 [218]

5. 3 From Levels of Abstraction to Truth Tables

Building on the first relationship that was described for level one in mathematical logic's most fundamental statement, see page 67 in the previous section, Jaques *et al* posit a contrast system for the remaining four levels. However this contrast system requires an alternative view of the element. Prevoiusly the element was viewed in terms of relations with poles, but the contrast system views it in terms of distinctions between self and object. Up to now, one could say that the structure thus posited was of self and object, or the mother and child, as a system. The change of view point from relations to distinctions could be viewed as the realization of the barrier between the autopoetic system and it's environment.

The element will always be operating under the following conditions:

1. It may operate in the confusing mode.
2. It may operate in the discriminating mode.
3. It is always operating in the confusing mode or the discriminating mode, i.e. if not operating in the confusing mode it is operating in the discriminating mode and vice versa.
4. No static position is allowable, meaning that no particular degree of definition of poles is attained and maintained.[219]

[218] Ibid, p 118.

It must be emphasized strongly that T for “true” and F for “false” refer here to variables in sentencial logic and not to “truth” or “un-truth” in the language sense. Jaques puts it this way:

> But the reader may object “In using truth tables, are you not destroying the distinction between psychology and logic?” The answer would be that we are concerned here with *assignment* of *T* or *F* to statements, not with valid consequences of statements nor with inference based on tautologies as laws. We are concerned with tracing the roles of *T* and *F* through repeated use of tables as organized for the general purpose.[220]

Thus starting with relation in level 2, the level 1 relation is an absolute invariant during the imposition of the level 2 relation; the level 2 relation cannot exist without it and no level 2 relation can be discriminated out of the chaos without this relation being distinct. So this level 1 relation has to remain fixed or absolute for use of a better word. Any further level 2 discrimination may be variable. At level 3 the new relation is posited upon the level 2 pole, which is seen as absolute at level 3, but the level 2 pole is invariant relative to a level 1 pole. Thus it follows that the level 3 pole is an invariance relative to a previous invariance. This process continues, adding complexity at it progresses along the different levels.

The link to logic truth tables appears in the the result of the analysis of the movement from one level to the next. The previous level forms the structure for the relationship at each subsequent level.

If we refer back to the two equations for level 2 on page 63, there are two ways in which the duality of relationships can be analysed. The first is the pole unity, and the second is the new relation in which a double pole comes into play that includes the relation inherited from level 1.

The first in terms of pole unity, in the representation $S_2^2 \longleftarrow R_2 \longrightarrow O_2^2$, even though S_2^2 has two internal poles $(S_2^2 \longleftarrow R_1 \longrightarrow O_2^1) \longleftarrow R_2 \longrightarrow O_2^2$ since it is the integrated unity $(S_2^1 \longleftarrow R_1 \longrightarrow O_2^1)$, it is viewed as a single pole and thus the following possibilities hold for the first analysis:

1. Two double poles equivalent to one double pole - true.(T)
2. One double and one single pole equivalent to a single pole - false. (F)

---

[219] Ibid, p 137.

[220] Ibid, p 140

3. One single and one double pole equivalent to a single pole – false. (F)
4. Two single poles equivalent to one single pole – false. (F)[221]

Written in mathematical logic it reduces to the following table:

For ∧ and		
p	*q*	*p∧q*
T	*T*	*T*
T	*F*	*F*
F	*T*	*F*
F	*F*	*F*

From the truth table the relation between poles is seen to be characterized by the "∧/and" relationship.

Keeping in mind that that at level 2 a double pole, as inherited from level one, is associated with T and a single pole is associated with F[222], as a single pole in a system is only being posited at this level. Futhermore, keep in mind that T and F are no longer independent as they might have ben at level 1.

When analysing the new relation in which a double pole comes into play that includes the relation inherited from level 1, the "equivalent to" of the above analysis becomes the "at least" and you would now have the following possibilities for the representation $(S_2^2 \leftarrow\!\!- R_1 \rightarrow\!\!- O_2^1) \leftarrow\!\!- R_2 \rightarrow\!\!- O_2^2$:

1. Two double poles equivalent to one double pole - true.(T)
2. One double and one single pole equivalent to a single pole - true. (T)
3. One single and one double pole equivalent to a single pole – true. (T)
4. Two single poles equivalent to one single pole – false. (F)[223]

Written in mathematical logic it reduces to the following table:

For ∨ or		
p	*q*	*p∨q*
T	*T*	*T*
T	*F*	*T*
F	*T*	*T*
F	*F*	*F*

[221] Ibid, p 130.

[222] For a detailed explanation of how this is arrived at please see Ibid pages 127 -128.

[223] Ibid, p 130.

From the truth table the relation between poles is seen to be characterized by the "∨/or" relationship.

The same process can be applied for the various other operations in the truth table below.

For ∨ or			For ∧ and			For → if..then			For ↔ if&only if		
p	*q*	*p∨q*	*p*	*q*	*p∧q*	*p*	*q*	*p→q*	*p*	*q*	*p↔q*
T	*T*	*T*	*T*	*T*	*T*	*T*	*T*	*T*	*T*	*T*	*T*
T	*F*	*T*	*T*	*F*	*F*	*T*	*F*	*F*	*T*	*F*	*F*
F	*T*	*T*	*F*	*T*	*F*	*F*	*T*	*T*	*F*	*T*	*F*
F	*F*	*F*	*F*	*F*	*F*	*F*	*F*	*T*	*F*	*F*	*T*

Tabel 5. 1

At this point it is instructive to note the authors qualification regarding their departure point:

> We are not concerned with 'behaviour' in the sense of an observable object. As writers of this chapter we analyse. Any analysis of a total neural-glandular-motor bodily process, whether only in principle or by experiment, constitutes reference to objects external to the observed, behaving individual. Through these objects about which they necessarily communicate, the psychological observer and his subjects are socially related. In placing emphasis on the social aspect of the relation between psychologist and subject we are focusing attention on mind rather than on brain.
>
> Whereas, in the experimental work referred to in the previous chapter, attention was focused on the object seen as actually discriminated by the subject as his response abject, we are concerned in this chapter with the subject's response as integrated by the psychologist, something inseparable from the 'experience' of the psychologist when perceiving and acting with respect to the common object.[224]

Their purpose was the representation with a formal hierarchy of decision making which relates purely to the underlying process. They do not attempt to codify and abstract the process in itself as Nonaka attempted. The relation is essentially that of deeloping a system

[224] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), Note 1 on pages 133 – 134.

which is capable of measuring an attribute of the underlying process and so enable a method of predicting the potential based on the present.

They put it this way elsewhere.

> The hierarchical system of relations in which entities acquire meaning through functioning in a context is to be converted to a hierarchical' system of contrasts, through which context itself acquires interpretation. In the original system entities, defined by general conditions underlying their contexts, acquire meaning only in the contexts; whereas in the new system behavioural entities, defined by normative distinctions, are expressed as interpretations of systems. A 'normative distinction' is that between a thing as a mere *object-of-action,* defining action *in* general, and a thing such as a tool or one's hand, which is an instrument defining an act. We do not refer here to an individual's making a value judgment (interpretation of system) but to the fact that the distinction between (1) a mere action object and (2) a thing as an instrument, is impossible without the distinction between an individual and his being related to another individual trough an object, i.e. something strictly objective.
>
> The conversion of the initial system does not commit us to any particular philosophic view of 'judgment', but merely to the fact that individuals, including philosophers, classify behaviour or statements by actual distinctions. In all we do choice-making is expressed in the very singling out of an object of action rather than an object of an alternative kind. G. A. Miller has written *(Psychology, the science of mental life,* 1962): “Along with every name and every skill a child learns he also absorbs an evaluation.”... “These evaluations are different in every society and a person who does not know them cannot function in a manner acceptable to the members of that society.” ... “Within any single realm it may be possible to develop a consistent system of values, but the demands from separate areas may conflict in ways that seem impossible to reconcile.” .... “Why do we have to learn these value systems? What purpose do they serve? The answer springs directly from the fact that we are constantly being put into situations where we must express a preference, must make a choice between two or more courses of action.” ... “The act of choice is often embedded in great conflict and uncertainty.” ... “In these and thousands of similar conflicts, what we must do is to decide which values are greater, which more

> important. And to facilitate the constantly recurring processes of choice we try to organize our values into a coherent usually hierarchical system. [225]

I have added their characterization of levels and dualities as Appendix C.

5.4 Some Examples

This has been a very difficult conceptualization to grasp, but if I may offer a few examples of how the underlying structure works in the realm of sensemaking.

The first highlights a difference in the use of logic in language. In the Portuguese speaking colonies a statement can become a question merely by the intonation. The answer is the very "primitive form of statement *P* –"'statement" … and its "negation" *(NP)*. 'Negation' and 'affirmation' are associated with behavioural entities and are thus seen as unconventional language, language as direct action."[226]

By way of another example, if you asked an English speaking person the question, "is the washing machine not finished yet?", the answer would be "*no* the washing machine is is not finished yet". If you aked a Nguni language speaker the same question, they would reply "*yes*, the washing machine is not finished yet." Both replies convey that the "washing machine is not finished yet", but the underlyng truth tables points to a different logical process at work. If one had to rewrite the statements as folows,

> "*no*(F) the washing machine is is not finished(F) yet" = (T)

and

> "*yes* (T), the washing machine is not finished(F) yet" = (T)

it becomes clear than in terms of the truth table as found in Table 5.1 that the former uses a ↔/if & only if logic construct, whereas the latter uses a Ivgor construct. It must be emphasized here that there is no correct or incorrect method being demonstrated here, only a difference in terms of a measurable attribute of sensemaking.

The second example I wish to offer regards an incident a hospital where the following incident was recorded:

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[225] Ibid, p 135-136.

[226] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), p 13.

Emergency resusitation trolleys are equipped with a variety of items and are checked according to a check list before being returned to service. In this instance a trolley was found to be without a necessary item during an emergency, which in turn resulted in an investigation after the event. It was found that the trolley had been checked and that the check list showed that the missing item was marked as not present, but the trolley was placed into service despite this. When quetiond as to why the person had done this, they could not give an explanation.

My explanation relates to the the underlying sense making at work. If a person has a mode that relates to the ∨/or logic construct in use at the time, the one false (F) among the many trues (T) will not prompt a false (F) reaction as in this logic construct all statements have to be false for the aggregation to be false.

Once again I wish to emphasize that this example is not construed to be judgemental in any way.

The answer to the problem is to either ascertain the most likely logic construct the individual is likely to use, as per Jaques' methods of measuring human capability, or design the form in such a manner so as to aviod the ambiguities these differences in logical constructs can cause.

However, it cannot be denied that the level of logic is locked into the language.

5.5 Human Capability

By combining the results from from the research into timespan of discretion and the truth tables as derived from the research into levels of abstraction, Jaques and Cason collaborated in the book Human Capability.[227]

They define Human Capability as a measure of the capability that a person has to work, that is to say, "to use discretion and judgement in making the decisions that will enable the person to solve problems in working towards a goal (carrying out a task)."[228]

This capability contains three major elements of which only the first one, Complexity of Mental Processing (CMP) is generic. The other two are specific to each individual and are the values (V) a person holds as to what extent the person is interested or committed to this particular type of wor,k and skilled knowledge (K/S), the extent to which the person

[227] (Jaques, Elliott, and Cason, Kathryn, 1994)
[228] Ibid, p 20.

possesses the necessary skilled knowledge to do the work.[229] As each individual is unique in their development, the last two are variable and operate in determining to what extent the individual's CMP can be applied to the work in a particular field.

Due to the fact that the CMP matures through life, the CMP is an indicator of the individual's current potential capability (CPC). The individuals CMP are CPC are continually congruent as the maximum capability the individual could exercise at the present time and individuals are comfortable doing work at this level. Work below this level the individual feels underemployed, and when asked to do work above this level, the individual will feel stretched.

As it will not always possible to fit the individual into work that matches his exact CPC, the writers added a third concept, that of Applied Capability, which is in practice always lower than CPC. Jaques and Cason liken the relationship between CPC and Applied Capability to the relationship between *Potential Energy* and *Kinetic Energy*.[230] Kinetic energy is always lower than potential energy due various exogenous factors. The final concept is that of Future Potential Capability FPC; this refers to the potential capability the individual will have at various times in the future as they mature with age.

It must be emphasized that there is a qualitative difference in deteremining the various levels of CPC, V and K/S. Metaphorically speaking, CPC will reveal how tall the individual is, V will be an indication of how committed he is to playing basketball and K/S will refer to his basketball skill set and knowledge. You can accurately measure the height of the individual and thus know the individual to be tall enough, but you can only assess or judge if the he or she possess suffient knowledge and skills and question him or her about how much they value playing basket ball. Ultimately K/S and V can only be measured retrospectively through evaluating thes aspects of past performance; the individual may have the necessaryK/S, but if he doesn't value playing basket ball, he will not be successful at it. And *vice-versa*.

The following hypotheses follow from these definitions:[231]

1. Current Applied Capability (CAC) for any particular type of work is a function of level of mental complexity (CMP), degree of interest (Value) in that work, possession

[229] Ditto.

[230] Ibid, p 22.

[231] Ibid, p 24 – 25.

of the necessary experience and skilled knowledge specific to that work (K/S), and any dysfunctional personal qualities, if they exist (-T).

$$CAC=f\,CMP \cup V \cup K/S \cup (-T)$$

2. Current Potential Capability (CPC), i.e., the highestleve1 of work I a person could currently carry, in work that he or she valued and for which he or she had the necessary skilled knowledge and , experience, is a function of complexity of mental process (CMP) alone.

$$CPC = f\,CMP$$

3. Neither the amount of knowledge and experience a person may have acquired, nor the greatest value that person may place upon particular kinds of work, can give a measure of that person's innate maxinum current potential capability.

The above differs materially from the current mental age and IQ tests that yield a standardized score used in psychological testing. Typically these scores are subject to social differences such family environment, cultural background etc. Further they are results orientated as opposed to process driven. This is similar to Nonaka[232] in which the product is confused with the process.

In assessment procedures used in the managerial organizations these tests, typically those described by Bray[233] and Anstey[234], use a series of unconnected tests from which profiles are derived. These tests have no proper theory integrating the results into the profile and the final result is the product of a discussion among assessors. Thus the result is only as good as the assesors and is really more of a preference than a result and only take place at critical points in the individual's career, i.e. at initial recruitment or high level promotion. Thes activities are controlled by groups of people that are not held accountable for their results.

5.6 The Four Types of Mental Processing

[232] (Nonaka, 1995)
[233] (Bray, 1983)
[234] (Anstey, 1977)

Building on the work done in the previous chapter, there are four and only four distinct types of mental processing that individuals use when engaged in sensemaking through language. They are[235]

1. Declarative. Processing: a person explains his or her position by bringing forward a number of separate reasons for it. The reasons are separate in the sense that each is brought forward individually, on its own, and no connection is made with any of the other reasons; for example, “Here’s one reason for my idea, here’s another, I could give you others as well.” This method of processing has a disjunctive, declarative quality.
2. Cumulative processing: a person explains his or her position by bringing together a number of different ideas) none of which is suff.cient· to make the case, but taken together, they do; for example, a detective might argue, “If you take this first point (clue), and put it together with these three other items we have observed, then, it becomes clear that such-and-such has occurred.” This method of procssing has a pulled-together, conjunctive quality.
3. Serial processing: a person explains his or her position by constructing ; a line of thought made up of a sequence of reasons, each one of which leads on to the next, thus creating a chain of linked reasons; for example, “I would do A because it would lead to B, and B will lead on to C, and C would lead on to where we want to get.” This method of processing has a condition quality in the sense that each reason in the series sets the conditions that lead to the next reason,and so on to the conclusion.
4. Parallel processlng: a person explains his or her position by examining a number of other possible positions as well, each arrived at by means of serial processing (see above). The several lines of thought are held in parallel and can be linked to each other. To take an example, it becomes possible to take useful points from less favored positions to bolster a favored one. “If I start with a possible position that would lead to A and A to B, that would end in outcome 1, which I do not support. Or I could start with another position, that would lead on to C and thell to D and get tooutcome 2, which I also do not support. I like a third position because it could lead to E and then to F, and that could lead to the outcome 3 that I do favor, but only if you took action B from the first series, and inserted it between steps E and F on ,the way to outcome 3. This method of processing has a double conditional quality, in the sense that the

[235] (Jaques, Elliott, and Cason, Kathryn, 1994), p 30 – 31.

various scenarios are not only linked with each other, but they can condition each other as well.

5.7 Orders of Complexity of the Information Processed

As these four distinct types of mental processing manifest themselves in individuals, the same applies to the information itself that is processed, which then reveals a recursive hierarchy of categories of mental complexity. These combine with the types of the previous section 5.6 on page 75 to create figure 5.1 further below.

Children are observed using the lowest order and adults move between two higher orders. Jaques & Cason postulate a fifth "genius" order of complexity but as yet have no evidence to demonstrate this.

The levels of complexity are as follows:[236]

A. First Order Information Complexity-Concrete Verbal (Pointing)

This is the world of the child from the time it can speak to late adolescence. It is a world in which ideas and their expression in language are concrete in the sense that they are conducted in relation to specific objects that can be pointed to, (or could be pointed to, if they happened to be at some other place at the time.

B. Second Order Information Complexity-Symbolic Verbal Representation

Concrete things are chunked in verbal information as used in the everyday world of ordinary symbolic discourse. We deal with each other in symbolic, verbal terms without having to point to specific examples of concrete things that we may have in mind. This order of information complexity allows us, for example, to discuss our work, and to issue instructions to others in a manner that makes it possible to run factories, to design new products, to discuss orders with customers …

C. Third Order Information Complexity-Abstract Conceptual

Here we move into the world of what are commonly called abstract or conceptual ideas. We do not mean abstract in the sense, for example, of the removed-from-real-life-discourse of some academics who may use second order symbolic representation to *talk about abstract* ideas as against actually *wing* abstract concepts as a means of overcoming problems. Concepts are used by those with the necessary levels of capability to tackle the complex problems encountered at corporate levels in large corporations or the complexities of large-scale international political problems, as, for

[236] Ibid, p 32 -33.

example, being able to relate balance of payments, values, international competitive systems, …

D. Fourth Order Information Complexity-Universals

Here we move into the world of universal ideas and language used by those usually associated with genius, in handling problems of whole societies, developing lasting philosophies or ideologies, producing artistic masterpieces, or revolutionary developments in scientific theory. The variables are of a complexity well above that required for handling the problems of corporate life. Indeed, one of the outstanding characteristics of those few great corporate leaders who develop super-corporations is that they mature into this fourth order world in their later years, and develop very wide interests, as in the case, for example, of the Konosuke Matsushitas and Armand Hammers of the world.

These successively higher orders of mental capability and information complexity are more a confirmation of what is observed intuitivel in people. Some adults just seem to live on different planets to the rest of us. It also explains why in any given situation an event witnessed by a group of individuals will ellict very different descriptions of what transpired. Different individuals extract different cues from the same situation, different in quantity as well as quality. (See section 6.2.6 Focused on and by extracted cues on page 97)

The recursive hierarchy of categories of complexity of mental processing are integrated in table 5.1 below. The terms are designated as follows where the orders of information complexity will be designated by capital letters as:

A •• Concrete Order

B •• Symbolic Order

C •• Abstract Conceptual Order

D •• Universal Order

and the four types of mental process will be designated by numerals as:

1 •• Declarative

2 •• Cumulative

3 •• Serial

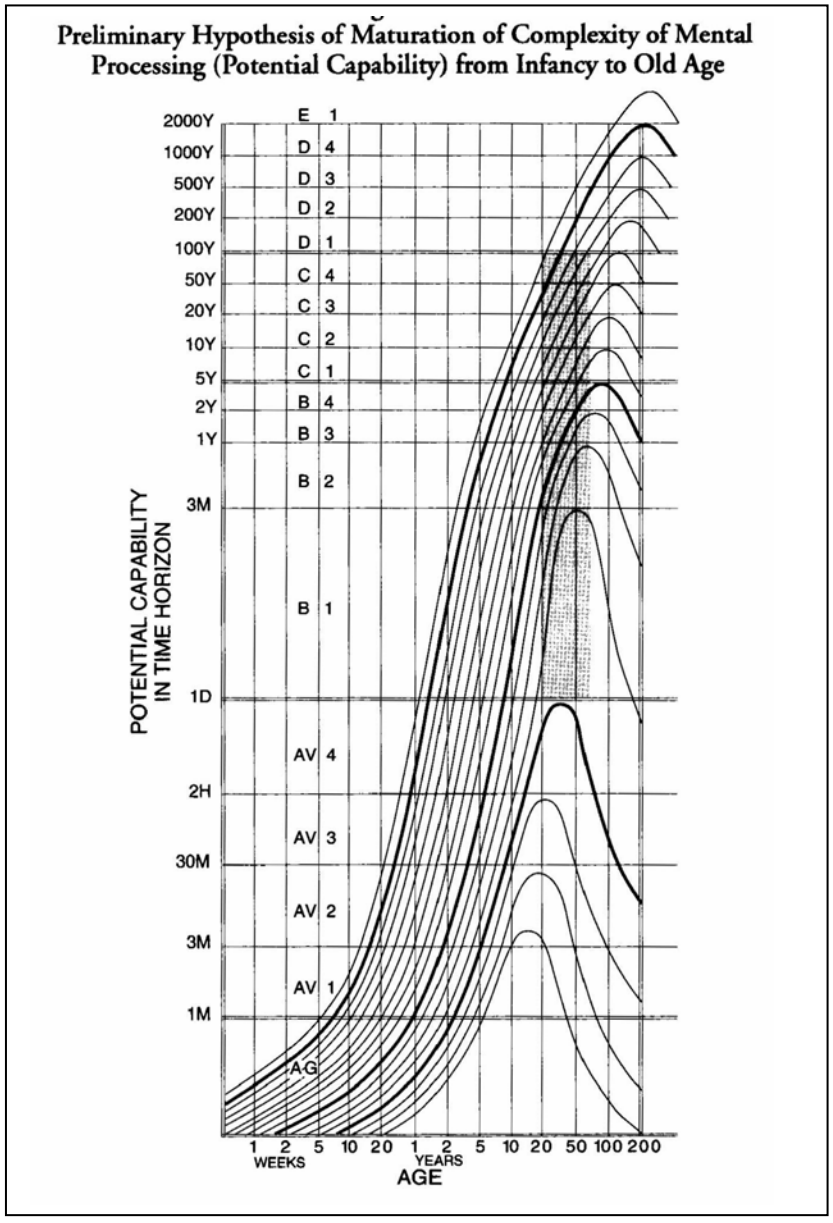
4 •• Parallel

Category	Order of Information Complexity	Type of mental Process
D4	Fourth Order Universal	Parallel
D3	"	Serial
D2	"	Cumulative
D1	"	Declarative
C4	Third Order Universal	Parallel
C3	"	Serial
C2	"	Cumulative
C1	"	Declarative
B4	Second Order Universal	Parallel
B3	"	Serial
B2	"	Cumulative
B1	"	Declarative
A4	First Order Universal	Parallel
A3	"	Serial
A2	"	Cumulative
A1	"	Declarative

Table 5. 1 Categories of Complexity of Mental Processing[237]

[237] Ibid, p 35.

The three themes of mental maturation over time, mental processing ability and levels of information complexity are brought together in the Figure 5.1[238] below.



The hypotheses above were tested in a study conducted with the collaberation of two companies[239], Gilbert Commonwealth in Reading, PA, and Atlanta, GA, USA and CRA in Australia. Gilbert Commonwealth provides design, construction, and technical services to the power generating industry, and employs about 5,000 people, CRA owns mines, smelters, and production facilities throughout Australia, the Pacific basin, Europe, and the United States. It

[238] Ibid, p 96.

[239] Ibid, p 44.

employs about 25,000 people. The results showed a very strong correlation between theory and practice at these two companies[240].

5.8 Summary

As stated earlier, this is by far the most complex chapter in this thesis. We saw how the concept of continuous change of one variable led to distinct points of transformation in other attributes of entities, i.e. the constant change in temperature in water form $0^{o}K$ leads to distinct changes of state (from ice to water to steam) at specific points, led to Jaques to seek something similar in the development of of individuals. This led to the discovery of the Discontinuity in Psychologicla development in adults as an adults as an extension of Paiget's work in children.

Collaboration between Jaques, Gibson and Isaac in analysing the discontinuities found in the capabilities of geometry students to grasp abstract concepts led to experimental work that supported the theory of different levels of abstraction in individuals. Jaques *et al* then used their various backgrounds in psychology and mathematics to bridge the levels of abstraction to truth table logic. I present a few examples to illustrate this.

This is the core of the hypotheses on Human Capability, the four types of mental processing and the orders of complexity of the information. Although not included in this thesis, these hypotheses were confirmed in a number of studies done in the US and Australia and reported in (Jaques, Elliott, and Cason, Kathryn, 1994).

[240] Ibid p 51 – 60.

Chapter 6

Weick's Organizational Sensemaking

Words, those precious cups of meaning….

Augustine.

In Weick's own words, "sensemaking, is best described as a developing set of ideas with explanatory possibilities, rather than as a body of knowledge."[241] He further describes the "sensemaking perspective is a frame of mind about frames of mind that is best treated as a set of heuristics rather than as an algorithm."[242]

This sounds as if it would fit into the category that Jaques laments as "the cultivation of vagueness and confusion in our own organizations"[243] (See page 16). Statements like the above put Weick in the behaviourist[244] camp while Jaques is most certainly a structuralist.

Nevertheless, both Weick and Jaques have the same end in mind even though they each follow a different path to reach their goal.

Weick broadens the above definition of sensemaking to involve "identity, retrospect, enactment, social contact, ongoing events, cues, and plausibility."[245] He expands it further as involving "interpretation"[246] through "authoring as well as reading."[247]

Boisot in his book *Knowledge Assets - securing competitive advantage in the Information Economy*[248] states "that codification can usefully be thought of as a process of *giving form* to phenomena or to experience."[249] This act of "codification" can be equally applied to the

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[241] (Weick, 1995), p xi.
[242] Ibid, p xii.
[243] (Jaques, Creativity and Work, 1990) p 3 – 4.
[244] (Thelejane, 2010) says the same on p 2.
[245] (Weick, 1995), p 3.
[246] Ibid, p 7
[247] Ditto.
[248] (Boisot, 1999)
[249] Ibid, p 41

individual as he or she negotiates and makes sense of the seemingly perpetual "ambiguity and equivocation" found in the day to day life of organizations. Jaques refers to this as work, "making judgements and using discretion to overcome obstacles in pursuit of a goal."[250] I have dealt with this in more detail in section 3.3 on page 299 above. The above are congruent to Weick's sensemaking.

6.1 Overview

Weick has differentiated this ineffable phenomenon into seven distinct processes. One of the very first obstacles to overcome before sensemaking proper can begin is "the fallacy of centrality," a term coined by Westrum in his article Social intelligence about hidden events.[251] It refers to the sense maker's confidence in their knowledge of their field of operations being so great that they either cannot or will not recognize the unusualness of certain events taking place in front of their very eyes. This of course does not continue indefinitely and the sensemaker is eventually prompted or forced to take notice.

So sensemaking starts when the answer to the question, " is it still possible to take things for granted?", is no. At this point it has become impossible to continue with automatic information processing.[252]

Thus Weick's sensemaking is initiated by surprise as discrepant cues, which are not readily understood or don't immediately "make sense," interrupt the continuous plausibility of the observed reality. These discrepant cues cause the sensemaker to confirm them to be discrepant by retrospective examination of events leading to that which is out of place being noticed, all the while seeking to fit them into known plausible explanations.

Having confirmed the uniqueness of the cues, the sensemaker now acts on the discrepancies, almost in an effort to confirm that he is not "seeing things" by conferring with other sensemakers, all the while seeking further cues that either confirm or negate that which has attracted his attention. At this juncture he also has to overcome the "fallacy of centrality" of his peers and colleagues. Eventually a plausible explanation arises and is added to the knowledge store.

Not all sensemaking necessarily takes place in the conscious mind. Human beings are deluged with output on the outside of their autopoetic barrier, but are only capable of

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[250] (Jaques, Creativity and Work, 1990), p 49.

[251] Ibid: Weick refers Westrum, R. (1982). Social intelligence about hidden events. *Knowledge*, 3(3), 381-400 on page 4.

[252] (Weick, 1995), p 14.

recognizing and converting a fraction of it into data. A prerequisite of being able to convert external output into data is knowledge, and as we know we have the capability of retaining knowledge, some which we can make explicit through the use of language, and a different type that remains tacit. In the main Weick seems to refer to explicit or conscious sensemaking in the organizational setting but doesn't say much about it as an unconscious process, other than to quote from Meryl Louis. Here he quotes it as a "recurring cycle comprised of a sequence of events occurring over time … as individuals form unconscious and conscious anticipations and assumptions, which serve as predictions about future events ... that may be discrepant from predictions."[253] It is the making sense of these discrepancies that produces or leads to surprises. He also quotes Gioia & Chittipeddi[254] "as a more private, more singular activity."

In the making of sense, cues are also said[255] to be placed in "frames"; frames are mental constructions of sensory inputs that have previously been validated as accurate and non-threatening. In Jaques' epistemology, this represents knowledge as he defines it as that which you are sure of and therefore can trust. Over time these "frames of reference" become more "dense" in their detail resulting in less frequent surprises.

Surprise also implies a lack of understanding the meaning, or the lack of integration into "meaningfulness", of the cues that caused the arousal. Sensemaking can therefore also be seen as an act of creating new meaning, through a cycle of "information seeking, meaning ascription, and action,"[256] very similar to Jaques terms of " lysis and scanning" that include "gathering, linking, and synthesis of the elements which fit."[257] The words synthesis and interpretation are two sides of the same coin. Both refer to an act; synthesis denotes the act of converting two or more "things" – objects, ideas, intentions etc. - into one, and interpretation is "acceptable and approximating translation,"[258] an act converting a text, statement, intention

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[253] Ibid, p 4; Louis, M. (1980). Surprise and sensemaking: What newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly*, 25, 226-251.

[254] Ibid, p 5; Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal*, 12, 444

[255] Ibid, p4; Dunbar, 1981; Goleman, 1985, pp. 197-217), Starbuck and Milliken (1988), p. 51.

[256] Ibid, p 5; Thomas, J.B., Clark, S. M., & Gioia, D. A. (1993). Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action, and outcomes. *Academy of Management Journal*, 36, 239-270, p 240.

[257] (Jaques, Creativity and Work, 1990)

[258] (Weick, 1995), p 7; Mailloux, S. (1990). Interpretation. In F. Lentricchia & T. McLaughlin (Eds.), *Critical terms for literary study* (pp. 121-134). Chicago: University of Chicago Press, p 121.

etc. in terms of something already known or defined and in so doing creating a new meaning. However they are post the fact, almost as if they are the result of initial sensemaking and form part of the continuing processes.

Time also plays a role in sensemaking, as cues are present tense inputs that need to be fitted into frames that have been developed from past experiences. It therefore follows that sensemaking takes place in kairos time and fits very well with Jaques' treatment of the role of time in the human cognitive experience.[259] Refer to the above Chapter 4 section 4.3 Kairos to Chronos on page 55 in particular.

Sensemaking that is shared with others gives rise to sense-giving or sense-directing and can be considered a key element of leadership. Leaders inform the sensemaking of those they lead by projecting a framework of the future that is plausible.

In sensemaking that takes place in the context of problem solving, the uncertainty is eventually replaced by action, usually the application of techniques relevant to the field of operation, but this in turn can lead to unforeseen complications. This implies that the problem is framed selectively, the sensemaker selecting the contents or elements to generate the problem as he makes sense of it.[260] I have added a document known as the "*Phoenix Checklist*" as an example of a method of problem definition.[261]

It follows on from this that sensemaking can also work in reverse, in the sense that we extract meanings from cues that fit a preconceived frame. Here Weick refers to Garfinkel's study of decision making in jurors[262];

> *The outcome comes before the decision.* In the material reported here, jurors did not actually have an understanding of the conditions that defined a correct decision until after the decision had been made. Only in retrospect did they decide what they did that made their decisions correct ones. When the outcome was in hand they went back to find the "why:[.]

All of the above can be said of Jaques ineffable process of decision making. It is not just a continual conscious activity to be described only in words, but operates at all levels of human

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[259] (Jaques, The Form of Time, , 1982)

[260] (Weick, 1995), p 9.

[261] See Appendix D

[262] (Weick, 1995), p 10; Garfinkel, H. (1963). A conception of, and experiment with, "trust" as a condition of stable connected actions. In O. J. Harvey (Ed.), *Motivation and social interaction* (pp. 183-238). New York: Ronald., p 110 -115.

existence; Jaques extends this as essential to all of life on the planet. The main difference is that Jaques refers to the how whereas Weick refers to the what.

6.2 Weick's Seven Properties

Weick proposes the following seven distinguishing characteristics to describe sensemaking:

1.Grounded in identity construction

2.Retrospective

3.Enactive of sensible environments

4.Social

5.Ongoing

6.Focused on and by extracted cues.

7.Driven by plausibility rather than accuracy

The above set sensemaking apart from other explanatory process such as understanding, interpretation, or attribution.

The following extract is a compelling overview of the above.

> "The little girl had the making of a poet in her who, being told to be sure of her meaning before she spoke, said: "How can I know what I think till I see what I say?" (Wallas, 1926, p. 106). ... The recipe is about justification (my thoughts justify my earlier words), choice (I choose which words to focus on and which thoughts will explain them), retrospective sensemaking (I look back at what I said earlier from a later point in time when the talking has stopped), discrepancies (I feel a need to see what I say when something doesn't make sense), social construction of justification (I invoke the thoughts I have been socialized to label as acceptable), and action as the occasion for sensemaking (my act of speaking starts the sensemaking process)."[263]

The above serves as a rough guideline that in certain situations will have feedback loops between some, while others may drop off after a while. They are all inter-related, all incorporate action and context at certain stages and continually either order or confuse the whole process. Once sense is made, the sensemaking processes recede until the next event, or episode as Jaques would call it. In computer parlance, it "terminates but stays resident", ready to be activated when required.

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[263] (Weick, 1995), p 12; Wallas, G. (1926). *The art of thought.* New York: Harcourt Brace, p 106.

As the statement “How can I know what I think till I see what I say?" captures sensemaking so eloquently, it is used as a template for analysing instances of sensemaking. I will review each of the seven process separately.

6.2.1 Grounded in Identity Construction

Sensemaking presupposes consciousness and whereas consciousness can emerge in many forms (individual, group as in nation, language, herd etc.), the above process pertains mostly to a single person in whom the sensemaking is initiated and thus the sensemaker is self-conscious when making sense. This eventually extends to groups as it follows the Social Learning Circle[264] in *Boisot’s Knowledge Assets - securing competitive advantage in the Information Economy*. While Jaques may refer to both sub-conscious and conscious (or controlled, intentional) sensemaking, Weick focuses primarily on the latter. It therefore follows that self identity plays a role.

Furthermore, every person plays many roles in their day-to-day engagement with their environment, particularly in their social environment. In his immediate environment, a man is at the same time a son to his father and mother, a husband to his wife and a father to his son and daughter. In his extended environ he could be both a manager of resources and a managed resource. Jaques also treats this subject of roles extensively.[265]

As Weick puts it, “anyone sense-maker is, in Mead's words, "a parliament of selves.""[266] The “self” in each role responds in a manner appropriate to the role and thus projects the subjects own internal visualization of the role onto each episode. In cases where roles overlap the sensemaker has to first select and appropriate the relevant identity i.e. when a father has to mediate in a disagreement between mother and child, he will be forced to choose between roles of husband or father and this choice will colour his further sensemaking. This choice in itself is subject to deeper needs, these being “three self-derived needs:

- the need for self-enhancement, as reflected in seeking and maintaining a positive cognitive and affective state about the self;
- the self-efficacy motive, which is the desire to perceive oneself as competent and efficacious; and

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[264] (Boisot, 1999), p 58 – 63.

[265] (Jaques, Measurement of Responsibility: a study of work, payment and individual capacity, 1956) and (Jaques, The Form of Time, , 1982)

[266] (Weick, 1995), p 18.

- the need for self-consistency, which is the desire to sense and experience coherence and continuity."[267]

So the identity selection process is also subject to the continuous reassessment of the self image in particular, and with the image of the corporate or group the self is affiliated to in general. As there is no direct feedback mechanism as to how the environ perceives the sensemaker's self-image, he has to create this in his imagination; he/she has to "think what they think."[268] Thus the sensemaking is self-referential and exhibits five main characteristics. Sensemaking is

1. triggered by a failure to confirm one's self,
2. occurs in the service of maintaining a consistent, positive self-conception,
3. people learn[ing] about their identities by projecting them into an environment and observing the consequences,
4. people simultaneously try[ing] to shape and react to the environments they face,
5. the self, rather than the environment, [that] may be the text in need of interpretation.

The person's self-conception therefore needs to be flexible, mutable and adaptable so as to be able to fit the most appropriate "self-frame" to the meaning derived from the cues perceived in the situation. The greater the number of "self-frames", the greater the parliament of selves and the less likely to be surprised into sensemaking. This refers to the contents of Jaques' Information Storehouse as described on page 34 in section 3.4 .

Jaques describes the process as follows:

> I have treated the discriminated object and continuous field perspectives as two poles of a relationship, symbolized as $[DO]^{df} \sim [CF]^{do}$. The relationship between these two poles is that of the activity of the experiencing self, of the person. The experiencing self does not exist in isolation: it exists, and can only exist, in our continuous interaction with other people and with things. It is out of this activity that the experiencing self generates its discrimination of object out of undiscriminated field, and then its awareness of field itself. We gain in knowledge and skill from this

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[267] Ibid, p 20; Erez, M., & Earley, P. C. (1993). *Culture, self-identity, and work.* New York: Oxford University Press. Evered, R., & Louis, M. R. (1981). Alternative perspectives in the organizational sciences: "Inquiry from the inside" and "inquiry from the outside." *Academy of Management Review,* 6, 385-395, p 28.

[268] How many times have you heard a person start a sentence with "you think that I am…(stupid/fat etc.)"? This is often a dead give-away of how the person is actually projecting their self-image into the episode, all the while attempting to manipulate you into altering your own self-image as you meet the above 3 needs relative to yourself. The simple answer is "you are the one doing the thinking there."

oscillation between growing discrimination of objects and increasing confidence in functioning in the continuous field mode necessary for action.

It must be noted, however, that our reflexive awareness of the experiencing self does not remain unaffected by the cognitive oscillation described. In the $[DO]^{cf}$ discriminated-object dominant perspective the self also is perceived as object. We are aware of the limits of our body image as somehow the objective representative or manifestation of ourselves. We can observe ourselves in action, seeking things, doing things, saying things, accomplishing things and, above all, meaning things.

It is in this mode also that we know ourselves as facts, know of our identity. We do so on the temporal axis of succession. We identify ourselves as the same person at this time (the retrospective reconstruction of a moment ago) as the person retrospectively known at an earlier time, both these times being linked within the context of the background awareness of memories and feelings which are the of context of the $[DO]^{cf}$ perspective.

In the $[CF]^{do}$ continuous field perspective the self is no longer discriminated, but is rather the subject of a vague awareness as being in continuous motion, in action, in flux.[269]

6.2.2 Retrospective

Sensemaking is always retrospective. While Weick quotes Pirsig in stating that

> Any intellectually conceived object is always in the past and therefore unreal. Reality is always the moment of vision before intellectualization takes place. There is no other reality[270],

Jaques refers to the “perpetual present” as neither the past or the future are places that we either are coming from or going to. He holds that there

> can be no external and objective meaning attributable to the idea of the immediate now, the immediate present. There is no record or artefact to refer to with respect to presentness; no comparison between the immediately present A (now) and a past B, nor between the immediately present A and a future B. For, the moment we have abstracted and verbalized and made conscious a particular A, the thing or event

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[269] (Jaques, The Form of Time, , 1982), p 208.

[270] (Weick, 1995), p 24; Pirsig quoted in Winokur, J. (1990). *Zen to go.* New York: Penguin, p 82.

> described is earlier than the formulated description. In short, the immediate present cannot be dated in the immediate present, because as soon as it is, it is no longer in the present.[271]

Both Jaques and Weick agree broadly that "time exists in two distinct forms, as pure duration and as discrete segments. Pure duration can be described …[as] a "stream of experience"… a "coming-to-be and passing-away that has no contours, no boundaries, and no differentiation"".[272],[273].

Weick notes the following four points regarding the above;

1. It is an "attentional process" which requires focus and as well as attention, despite the fact that the focus is on that has already occurred.
2. As the attention directed backward, whatever is occurring changes what is discovered at each glance, just as a landscape unfolds when driving along a road and facing backwards. There are no cues to indicate what to expect, but what appears is able to change the initial frame completely.
3. The memory that is continuously being set into frames not only is changed by older memories, but also alters the older memories.
4. The sequence, stimulus- response, can be a misleading analytical unit as sometimes sense is only made after an outcome has been decided on.

We have all heard the statement 'hindsight is an exact science' before; the above shows us why. Looking backwards always has a bias of oversimplifying causality by emphasizing that which reinforce the end result, i.e. a failure debriefing done in retrospect will be peppered with the words "if only I/we had/hadn't", "should have" and "shouldn't have", all high-lighting the errors and ignoring successes, even though it was impossible to predict what the outcome of any of the actions would have been at the time. Thus the memory of the event is reconstructed in terms of the outcome with many of the more difficult aspects just being erased.

The following three aspects need to be kept in mind with regard to bias in retrospective sensemaking;

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[271] (Jaques, The Form of Time, , 1982), pages 76 – 77.

[272] (Weick, 1995), p 25; Schutz, A. (1967). *The phenomenology of the social world.* Evanston, IL: Northwestern University Press., p 47.

[273] (Jaques, The Form of Time, , 1982), p 76; here Jaques quotes Bergson as "Flow, flux, is grounded in the unconscious experience of the functioning of one's own mind, including the unconscious experience of the continuous unfolding, shifting, and changing of goals, desires, memories, intentions, and feelings."

1. In the day-to-day life, the time-spans between act and reflection is relatively short, resulting in a more accurate retrospection with less distortions.
2. The past may become clearer with time through partial erasure, or as subsequent events explain previously misunderstood aspects, but cannot make sense of the present or clarify the future.
3. Retrospective sensemaking subsides as soon as the person is satisfied with the explanation.

Retrospective sensemaking is used in "future perfect thinking … it is easier to make sense of events when they are placed in the past, even if the events have not yet occurred. Boland[274] reported that a major outcome of the experiment was that in trying to understand what had been done in an imaginary future, participants discovered that they had an inadequate understanding of an actual past."[275]

From the above it is clear that memory plays an important role in retrospective sensemaking. As Jaques Levels of Abstraction in Logic and Human Action are based on the logic constructs used in computer sort algorithms, it follows that a person with a different capability of logical ability will have a different degree recall in terms of not only events but detail as well, and would then be capable of a more accurate from of retrospective sensemaking. If much of retrospection is "a text in need of interpretation" then the variation in logical abstractions found in languages will also play a role.

It is not yet clear to me what role the density of perception plays in retrospective sensemaking.

6.2.3 Enactive of sensible environments

The first point to note is the real nature of the environment. It is not a still-life canvas on which the sensemaker applies the various sensemaking processes. The sensemaker by virtue of being part of the environment creates the very environment, i.e. the mere fact the a person is in a room, even if all he does is breath, causes the temperature and air currents in the room to be different compared to if he was not there. This is a phenomenon that relates to Heisenberg's uncertainty principle in that the very act of observing can change that which is

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[274] (Weick, 1995), p 29.

[275] Boland, R. J., Jr. (1984). Sense-making of accounting data as a technique of organizational diagnosis. *Management Science, 30, 868-882.*

observed. In 1979 Gary Zukov presented a similar idea of "creation through participation" in his book "*The Dancing Wu Li Masters: An Overview of the New Physics*"and Jaques refers to the same concept in his book "*The Form of Time*".[276]

So the sensemaker is sensing the effect of his action, or inaction for that matter, in relation to the environment. The deliberate action can therefore been seen as a prodding or probing of the environment, the effects of which are then made sense of retrospectively. As Jaques puts it,

> They must be followed as they unfold, and then must be reconstructed retrospectively once they have reached their conclusion. But then so too is the observation of a physical object a process. No object can be observed all at once. The description of an object is also a retrospective reconstruction. The idea of an object that does not change, that remains fixed while we observe it, is a human fantasy, … moreover, a severely distorting fantasy, ...[277]

This also sounds remarkably like Maturana and Varela's "structural coupling".

Weicks chooses the word "enactment" because it captures the action of the sensemaking in the environment. We are not in the environment, we are the environment, very similar to an extended "ubuntu" principle in African societies – "I am what I am because of who we all are [and who I all make you]". Follett puts it as

> …behaviour is a relating not of "subject" and "object" as such, but of two activities. In talking of the behaviour process we have to give up the expression act "on" (subject acts on object, object acts on subject); in that process the central fact is the meeting and interpenetrating of activities. What physiology and psychology now teach us is that part of the *nature* of response is the change it makes in the activity which caused so-to-speak the response, that is, we shall never catch the stimulus stimulating or the response responding.[278]

To this extent our sensemaking actions can be seen as a relating or "confronting [of] the activity of environment,"[279] which lead to the surprise in the first place.

It is at this point, where the emphasis is on relating, that I would like to remind the reader of the work done by Jaques as described in the previous chapter. The basis of Jaques work in the

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[276] (Jaques, The Form of Time, , 1982), p 108.

[277] Ditto

[278] (Weick, 1995), p 32; Follett, M. P. (1924). *Creative experience.* New York: Longmans, Green, p 60.

[279] Ibid, p 33; " " , p 33.

levels of abstraction in logic and human action are based on the relationships that arise as a person interacts with their environment from the very first moment. The words “interact with” can just as well be replaced with the words “make sense of”.

Enactment is action driven; it’s about “invention and construction”[280]and not a film in which the observer is static. It reminds me of Computational Fluid Dynamics, in which the observer is either standing to one side watching the flow pass by, or on a particle in the flow watching the sides pass by. Enactment is a combination of both; you not only watch the movement, but also cause the movement. The origin of the enactment may be “in mental models of causally connected categories”[281], and thus subjective and static in their nature, we have to be wary of “ontological oscillation”[282] in trying to describe the dynamic through observation of the static.

Weick list two cautions regarding the concept of enactment, the first being that creating is not the only possible act; doing nothing is equally enactment in process. For the second Weick quotes Varela et al as follows:

> Beware …Cartesian anxiety [which] is "best put as a dilemma: either we have a fixed and stable foundation for knowledge, a point where knowledge starts, is grounded, and rests, or we cannot escape some sort of darkness, chaos, and confusion. Either there is an absolute ground or foundation or everything falls apart.[283]

This has a philosophical aspect to it that points to nihilism. The proposed solution is to embrace chaos as the source of the variety in our lives. Although Jaques has the same starting point, i.e. chaos, he points to all an consuming quest to enact order into our lives. The order is essential to survival, primarily in terms of physical needs that have to be met. By this broadening the act of sensemaking to incorporate all of life on the planet and then separating homo sapiens out of it as the only species capable of “languaging,” as opposed to the proto-language used in signalling, he points out that this ability leads to the capability of abstraction. It is the nature of abstraction that demands that meaning be assigned to the words and symbols, that that which is sensed also has to be “languaged.” This difficulty does not exist in the greater panoply of life on earth and is purely a limitation of languaging. Weick

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[280] Ibid , p36.

[281] Ibid, p 37.

[282] Ibid, p 34.

[283] Ibid, p 37; Varela, F. *J.*, Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience.* Cambridge: MIT Press, p 140.

alludes to this in his quote “sensemaking that multiple meanings abound and that "texts" can be read in more ways than were intended, to the point where meanings become interchangeable and power privileges some meanings over others,[284]” but does not make the connection that the confusion is actually only really perceived in the language world, and offers “faith and belief”[285] as an explanation.

The final word is however, is a variation of the saying, “handsome is as handsome does”, i.e. “sensemaking is as sensemaking does.”

6.2.4 Social

By virtue of the enactive nature of sensemaking as described above and keeping in mind that the environ has other people in it as well, a person’s conduct is also a product of other peoples’ enactment and is thus social in its nature, so much so that they we are “influenced by the actual, *imagined, or implied* presence of others.”[286] Language by default requires other people to exist, else it pointless; so sensemaking takes place in the context of others. Even if communication between people is in one direction only, i.e. a monologue, it takes place in the context that other people will be listening and therefore the social influences are not solely the result of or influenced by the physical presence of other people.[287] It is more the knowledge of other people and the potential influence of their subsequent enactments that move us to seek a coordinated sense of the “collective action” through a variety of meanings, be they shared, equivalent, distributed or overlapping, of the often ambiguous events.

Due to the potential variety of sensemaking attributes and abilities embedded in the sensemakers, attention should be given to the sufficiency as opposed to the specificity of the cues used for social sensemaking. The use of universals allow a greater variety of meaning to be derived than particulars, i.e. the word “tree” is a sufficient cue when selecting a tool to cut it down – select a saw. However, the cue has to be particularized when there are a multitude of trees that must be cut down; one would then more likely select a chain saw over a hand saw.

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[284] Ibid, p 38.

[285] Ditto.

[286] Ibid, p 39;

[287] Ibid, p 40.

6.2.5 Ongoing

The word ongoing could just as easily have been never ending. Sensemaking is continuous as opposed to continual, and according to Jaques continues even while we sleep, for which dreams give us a glimpse in to the subconscious sensemaking when at rest. Once switched on, there is no opportunity for a reboot.

Sensemaking is thus easily described as terms of flows, pure duration, or of "thrownness into ongoing situations"[288], as Heidegger named it. Weick quotes the following six properties pertaining to situational thrownness:

> 1.You cannot avoid acting: Your actions affect the situation and yourself, often against your will.
>
> 2.You cannot step back and reflect on your actions: You are thrown on your intuitions and have to deal with whatever comes up as it comes up.
>
> 3.The effects of action cannot be predicted: The dynamic nature of social conduct precludes accurate prediction.
>
> 4.You do not have a stable representation of the situation: Patterns may be evident after the fact, but at the time the flow unfolds there is nothing but arbitrary fragments capable of being organized into a host of different patterns or possibly no pattern whatsoever.
>
> 5.Every representation is an interpretation: There is no way to settle that any interpretation is right or wrong, which means an "objective analysis" of that into which one was thrown, is impossible.
>
> 6.Language is action: Whenever people say something, they create rather than describe a situation, which means it is impossible to stay detached from whatever emerges unless you say nothing, which is such a strange way to react that the situation is deflected anyway."[289]

From the above it can be derived that our thrownness is a long series of meetings in which streams of problems solutions people, and choices flow"[290] past us. For this reason the meeting plays an important role in helping to reach better sense.

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[288] Ibid, p 43.

[289] Ibid, p 44; Eccles, R. G., & Nohria, N. (1992). *Beyond the hype: Rediscovering the essence of management.* Cambridge, MA: Harvard Business School Press, (pp. 34-36).

[290] Ibid, p 44.

Jaques study in "*The Form of Time*"[291] was directed at the

> …behaviour of individuals and to the structure of social interaction, I am referring solely and exclusively to purposeful behaviour, to behaviour saturated with meaning and desire, impregnated with value and intent, directed toward goals, striving to achieve those goals, actively aimed toward intended outcomes.[292]

In the thrownness of their lives, these individuals experience interruptions in their pursuit of intended outcomes, which typically induce an emotional response. Physiologically this is where the fight-or-flight is aroused. Autonomic arousal that leads to emotion normally occurs 2-3 seconds after the interruption and lasts until either the interruption is removed or resolved. Generalists who normally have a large number of different responses or substitute behaviours available or are able to improvise, exhibit less emotional behaviour and are thus subject to less extreme emotions.

The emotions so aroused can either be negative or positive. Negative emotions are triggered when standard procedures are interrupted unexpectedly and sensed as being catastrophic, the emotions will intensify according to the duration of the interruption. However there are also two potential sources of positive emotions; the first is the sudden and unexpected removal of the interruption and the second is the sudden and unexpected acceleration that enables an early completion of a pursuit.

Depending on intensity, emotions have the ability to impair sensemaking as recall and retrospect are mood dependent and so people remember events that have the same emotional tone as what they currently feel. So, strong emotions can generate positive feedback loops that impair sensemaking in general. As Jaques puts it:

> It is possible, and indeed commonplace, not only for individuals but also for philosophical and scientific systems to get fixed upon one or other pole of the duality of discriminated object and continuous field. They do so by cleaving the duality, rupturing it, splitting it, so that effective oscillation cannot take place. This splitting and polarization leaves the person ensnared either in a static lifeless world or in an uncontrollably fluid and confusing one. Both states are disturbing, if not to the individual then to his relationships with others.[293]

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[291] (Jaques, The Form of Time, , 1982)

[292] Ibid p 106.

[293] (Jaques, The Form of Time, , 1982), p 209-210.

That interruption is the sole source of emotion remains a moot point. One could possibly understand the death of a loved one as an interruption of a deeper continuum, but how would the malaise sometimes experienced after the end of a long project be classed an interruption, and if so, of what?

6.2.6 Focused on and by extracted cues.

Because sensemaking is generally very quick, observers of sensemaking have to beware of falling into the same trap as Nonaka[294] in that they may find themselves observing the product as opposed to the process. It is for this reason that studies are done using paradoxes, dilemmas and inconceivable events that required a prolonged period of sensemaking; these were used to observe the ways in which people notice, extract cues, and embellish what they extract.[295]

Extract cues are important as they come to represent the whole, as if they embody the character of the complete field being observed. Thus the character of the cue is applied to the whole, even though it may only present one attribute out of many.

Weick likens cues to seeds, which serve as the starting point to develop a larger sense of what is transpiring. While we may be able to predict how the seed will unfold in its path to maturation, we have no real control over how it will develop. Similarly in the forming of a sentence, the options as to how the sentence can be completed diminish the closer the speaker gets to the end of it. What the extracted cue then develops into depends on context as this affects what is extracted as a cue and also how the cue is interpreted.[296]

The extraction of cues for sensemaking happens through the process of noticing. Noticing is not to be confused with sensemaking; the former refers to “filtering, classifying and comparing” of major perturbances at an aggregate level while the latter has more to do with the determining and interpretation of nuances to reveal what the cues mean.[297] Noticing is also not the same as interruptions as they are more likely to arouse curiosity as opposed emotion. The list of noticeable attributes range widely; they can generally be described as that which “appears to be out of context.” What is not noticed can’t be made sense of.

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[294] (Nonaka, 1995)

[295] (Weick, 1995), p 49.

[296] Ibid, p 49.

[297] Ibid, p 51.

As context affects noticing it also influences sensemaking as small, "subtle features have a large effect."[298] Without context objects and events give rise to "ambiguity and multiple meanings."[299] An equivalent to cues are indexicals in talking. Sentence in conversations often can have multiple meanings, but because of the context, i.e. the speaker, the occasion, the relationship between speaker and hearer etc. How often has one heard a story that doesn't sound so funny being clarified with, "you should have been there; it was so funny." Social context also plays a role; in political exchanges different meanings of the same events are often arrived at depending largely on the political party's constituency. Because individuals at different levels of a hierarchy will operate in different contexts, the sensemaking of the same events may differ widely from each other

Despite context and embellishments, cues have to be believable to evoke action. The action creates a tangible order from a suspected or assumed order, which can be the basis for the "self-fulfilling prophecy."[300] Often the cue doesn't have to be extremely accurate; it just needs to evoke enough confidence to act. The enactment in turn will generate more cues and the iterative cycle of "begin to act (enactment), … generate tangible outcomes (cues) in some context (social), and this helps … discover (retrospect) what is occurring (ongoing), what needs to be explained (plausibility), and what should be done next (identity enhancement)."[301] As confidence increases the cycle accelerates until a solution is reached.

Plans are often held up as the panacea of all successes, but ultimately it is only the doing that succeeds.

Jaques offers "lysis and scanning" as equivalent processes. I refer to this in the next section.

6.2.7 Driven by plausibility rather than accuracy

Plausible reasoning, as opposed to logical-deductive reasoning, necessitates departing from the need to be immediately accurate in assessing what there is to be made sense of as it requires going beyond what is directly observed or the current consensus to generate enough certainty so as to be able to act. As it is based on incomplete information, the reasoning is possibly incorrect at times even though is appears to fit all the facts. The level of accuracy in noticing variation is more a requirement of scanning. That said, Weick is a proponent of

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[298] Ibid, p 53.

[299] Ditto.

[300] Ibid, p 54.

[301] Ibid, p55.

"requisite variety"[302] -"complicate yourself if you want to understand complicated environments"[303] .

Accuracy plays a secondary role in sensemaking for the following reasons:

1. Individuals need to filter out the noise from signal to prevent themselves from being overwhelmed by the flood of data they receive.
2. As the extracted cues can have multiple meanings, it is necessary to select one from the many to start with; "accuracy is meaningless when used to describe a filtered sense of the present, linked with a reconstruction of the past, that has been edited in hindsight."[304]
3. There has to be a trade-off between accuracy and speed; as enactment shapes the environment, a quick intervention may be better than a slow accurate one in minimising the emotion generated from an interruption.
4. Accuracy is usually only necessary for limited periods at a time with regard to specific questions. The two types of accuracy Weick mentions are global accuracy, which enables the individual to predict behaviour across all contexts, and circumscribed accuracy that is focussed on a limited number of specific contexts.
5. As a lot of sensemaking occurs interpersonally with other sensemakers, the collective enactment makes for a situation where identities are being recreated all the time. It is therefore difficult to be constantly accurate mutable situations all the time.
6. Individuals in their discourse always oscillate between universals and particulars depending on necessity. Referring to a "tree" is accurate enough; it doesn't have to be a complete description of every branch, twig and leave every time.
7. We have all heard the term "analysis paralysis." Too much accuracy can have a immobilising effect.
8. Perceptions are "predictions of the current reality" based on incomplete information and it is therefore impossible to tell if the perceptions are true or not. The accuracy can only be determined in time retrospectively.

However while complete accuracy is not a necessity, the perceptions have to at least be "plausible and coherent … reasonable and memorable …embodies past experience and

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[302] Ashby's Law was derived from mathematical analysis - "variety absorbs variety, defines the minimum number of states necessary for a controller to control a system of a given number of states.".

[303] (Weick, 1995), p 56.

[304] Ibid, p 57.

expectations …resonates with other people …can be constructed retrospectively but also can be used prospectively …captures both feeling and thought ..that allows for embellishment to fit current oddities …is fun to construct. In short, what is necessary in sensemaking is a good story."[305]

6.3 Jaques' Process of Work

At this stage it may be of interest to list Jaques' formulation of the process underlying his definition of work. It is psychological origin and comprises of six main stages[306]:

1. the achievement of a particular objective is undertaken, and a *relationship is established with the objective*;
2. an *appropriate quantity of the mental apparatus must be allocated* to the task;
3. an *integrative reticulum* must be constructed and elaborated, within which the work is organized;
4. concentration upon the task, teasing out the contents of those areas of the mind occupied upon it, and a scrutiny and searching for elements which will help in solving the problem; a process I shall designate by the terms *lysis* and *scanning*;
5. *gathering*, *linking*, and *synthesis* of the elements which fit;
6. *decision*, by which is designated a taking of action with significant committal of resources.

At first glance there are stages that have no direct equivalent in Weick's formulation but there may be value in brief comparisons. According to Jaques, all of the above refer to the "interplay of mental events between the conscious and unconscious of the mind"[307], while Weick's sensemaking characteristics pertain to the conscious. Jaques grounds all activity in terms of objectives or goals to be attained, whereas Weick leaves it unspecified and seems to assume it. The goals are set by the "organization" and there is no personal driver specified.

An objective is an "object-to-be," the result of enactment. In analytic terms it is often referred to as the "creation of a baby and giving birth to it."[308] The relation to the objective will be dependent on how strong the desire to reach the goal and obtain the reward as well as the symbolic meaning and psychic gratification on reaching the objective, in other words, how

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[305] Ibid, p 61.

[306] (Jaques, Creativity and Work, 1990), p 337 - 355.

[307] Ibid, p 337.

[308] Ibid, p 338.

strongly the individual identifies with the objective. Mental capacity, or focus, is then allocated to working towards the objective, in relation to how strong the relation to the objective is.

The Integrative Reticulum refers the gaps between mental picture of the object and the methods of establishing it are examined. This could be seen as extracting cues.

The Lysis and Scanning, Gathering, Linking, and Synthesis are all essentially the same as the ongoing focus, enactment, and extracting cues, which ultimately lead to Decision and Action. The above takes place in a continuous cycle until the goal is achieved.

In addition, Jaques' maturation model demonstrates changes over time. Weick's sense making model is static.

6.4 Summary

In this penultimate chapter, I have dealt with the detail of sensemaking as explained by Weick in terms of his seven main processes. His formula "How can I know what I think till I see what I say?" is a useful tool that can be used in analysing instances of the same. The sentence encapsulates the various simultaneous activities as described by:

1. Grounded in identity construction
2. Retrospective
3. Enactive of sensible environments
4. Social
5. Ongoing
6. Focused on and by extracted cues.
7. Driven by plausibility rather than accuracy

In Weicks sensemaking model, the sensemaking is triggered by the noticing of cues that do not immediately fit retrospectively constructed frames. The greater the surprise, the greater the intensity of the interruption. This interruption leads to an emotional response, typically of anxiety or possibly even anger. It is also at this point that Jaques' concept of "*time-span of discretion*" is linked as Jaques theorises that a large part of Human Capability is the ability to deal with the anxiety caused by the uncertainty inherent in long term projects or episodes. There then follows retrospective action that requires the construction of an identity as a basis or departure point to enact a response. This retrospective construction is not necessarily accurate but takes its cue not only from the input causing the interruption, but past experiences and the ineffably formulated outcome the individual wishes to create through

their enactment. This relates to Jaques' concept "*judgement*". This is an on-going almost iterative process. Throughout the explanation I continually refer to Jaques and demonstrate how his theories make use of these same constructs in arriving at his own conclusions that form the basis of Requisite Organization.

In Jaques' model "*The Interactive Work Functions of Total Organisms*" as described in section 3.4, it could be said that the interruption is triggered by an event in the "*constructed field of attention*", interpreted in terms of the current "*needs, intentions and goals*" in relation to the content of the "*information storehouse*". This forms the basis for Jaques' sensemaking in all of life, which when extended to humankind, has to include that added social dimension of languaging as an addition to signalling.

Jaques refines the above further with the following:

1. the achievement of a particular objective is undertaken, and a *relationship is established with the objective*;
2. an *appropriate quantity of the mental apparatus must be allocated* to the task;
3. an *integrative reticulum* must be constructed and elaborated, within which the work is organized;
4. concentration upon the task, teasing out the contents of those areas of the mind occupied upon it, and a scrutiny and searching for elements which will help in solving the problem; a process I shall designate by the terms *lysis* and *scanning*;
5. *gathering, linking,* and *synthesis* of the elements which fit;
6. *decision,* by which is designated a taking of action with significant committal of resources.

It can be argued that Weick's "*grounded in identity construction*" in conjunction with his "*enacti[ng] of sensible environments*" is remarkably similar to Jaques' "*integrative reticulum is constructed*" in conjunction with his "*relationship is established with the objective.*"

Weick's "*retrospective*", "*focused on and by extracted cues*" and "*driven by plausibility rather than accuracy*" processes and Jaques' "*lysis and scanning*" with "*gathering, linking, and synthesis*" are practically equivalent. Whereas Weick refers to the "*social*" aspect, Jaques refers to the "*constructed field of attention*" or "*integrative reticulum*", which on the face of it is a much broader concept. Both agree that the process is ongoing.

Chapter 7
Conclusion

Now all has been heard; here is the conclusion of the matter:

Ecclesiastes 12

It has been a long journey through all of Jaques' work. At times I feel I have only scratched the surface and at others it appears to be so intuitive, even obvious. The experiment that led Jaques and Isaacs to their discovery of the levels of abstraction in human action is pure sensemaking. Weick's sensemaking in organizations is at one level higher; it contains the ambiguity of our relationships as well. Jaques' Requisite Organization structure attempts to minimize the effect of this "noise".

7.1 Jaques' change of view over time

In his early years, while working at the Glacier Metal Company, Jaques embraced a behaviourist view, with particular emphasis on psychodynamics. His hypothesis contained in the 1955 article *Social Systems as a Defense Against Persecutory and Depressive Anxiety"* [309] was the catalyst that eventually developed into Social Defence Theory. In this paper Jaques explored the social defences people construct when confronted by the negative emotions that are aroused when participating in large organizations. These emotions are largely generated by interpersonal dynamics and interpersonal relations. Jaques later recanted this position when he concluded that these were largely the effects of the structure and not the creation of the people occupying the structure. He then changed to a structuralist view which he held until the end of his life.[310]

Taking an overall view of Jaques' work, a trend can be traced from the beginning where he focused on individuals within group structures, that is, describing the particular reactions and defences that are adopted in response to the environment in which the individuals found themselves, to focusing on the broader issues facing humankind as a whole, a universality that could be applied not only in all cultures, but also to all forms of life. This was particularly evident in his last two books, *Social Power and the CEO: leadership and trust in*

[309] (Jaques, Social systems as a defence against persecutory and depressive anxiety, 1955)

[310] See the debates in (Amado, 1995).

a sustainable free enterprise system [311] and *The Life and Behavior of Living Organisms: A General Theory* [312]. This could be seen as moving from Aristotle's position of emphasis on the particulars, to Plato's position of emphasis on the universals. This progression is also a feature of the results of his research on time-span, where the human capability of individuals increases along predictable maturation paths with age. See page 79 in section 5.7.

7.2 Jaquian Determinism

There is no doubt in my mind that Jaques was an extraordinary sensemaker and that he is largely ignored because he is out of step with the current philosophic milieu, one he is apt to describe as more of a malaise. One large conflict in this context is Jaques' belief that human capability is not only unevenly distributed amongst the various populations, but that the various levels of human capability are discontinuous, which then leads to a natural stratification in societies. This then can be interpreted as justifying why the rich are rich and the poor are poor on a naturally occurring, biologically based determinism, e.g. Jaquian determinism.

The current milieu is rooted in the narrative, where truth cannot be known, but only verisimilitude deconstructed out of that which emerges. I personally still struggle to understand how something that acts in a purposeful manner can just emerge from chaos. Jaques on the other hand points to a realism that is tangible, that is based more in the equivalent of the periodic table of science and logic than in the alchemy of language. He points to an identity of humankind that is grounded not only in retrospection of the immediate past, but to its entomological beginnings of its language and beyond. Beyond that he extends his model of sensemaking to all of autopoetic life as decision making entities, all working to meet the needs of their very autopoesis. And just as their physical attributes are measurable in terms of length and height and the chemistry in their bodies is understandable in terms of the periodic table, their efficacy in this pursuit is measurable in terms of logic and time span.

But this certainty does not come without a cost.

Jaques' discovery of the link between time-span and human capability and a method of being able to predict an individual's potential capability in the future with a high degree of accuracy all point to a form of determinism hitherto unspoken. This determinism developed over more than a decade as Jaques moved from a predominantly psychologically based determinism as

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[311] (Jaques, Social Power and the CEO: leadership and trust in a sustainable free enterprise system, 2002)

[312] (Jaques, The Life and Behavior of Living Organisms: A General Theory, 2002)

proposed by Sigmund Freud and Melanie Klein to evolve his own biologically based structural type determinism. In his latter years he extended this detereminism to all of life on the planet in his swan song, *The Life and Behavior of Living Organisms: A General Theory* published a year before his death. The remarkable similarity in construction between Maturana and Varela's chemically based concept of autopoiesis and Jaques' *Levels of Abstraction in Logic and Human Action: A Theory of Discontinuity in the Structure of Mathematical Logic, Psychological Behavior and Social Organization* is compelling to say the least. This a major shift from his initial position on group dynamics.

It must be emphasized however, the Jaques' final position was not based on either a philosophical or psychological theory, but on repeatable experimental data in the true scientific sense. This represents not only the discarding of one theory in favour of another, but a more fundamental shift in methodology, from the social sientific "judgement and preference" to a homomorhic mathematical construct. Just as the discovery of Boyle's law does not represent a philosophicaly constructed position, neither can Jaques final theory be pigeonholed in the same way as behaviourism and the like. It is the acceptance of these results that has to have far reaching philosophical implications for society as a whole as opposed to the underlying philosophy having a bearing on his position.

Figure 5.1 on page 808 looks almost the same as the growth patterns in length of children as they grow into adulthood. These are used to be able to predict the height of a person when full grown: double their measured height at the age of three and you have a very good estimate of their height as a mature adult.

Now if this latter categorization of the human frame, which is an indication of measurable physical determinism, enabled the industrialization of the manufacturing of a base necessity, i.e. clothing, will this Jaquian determinism not ultimately lead to an "industrialization" of the necesssities of our human capability, i.e. the classification of who gets what education in terms of their time span potential as measured at a certain age, the structuring of jobs in a given population so as to match their measured timespan capabilities, the creation of carreer paths to fit the maturation curve of their measured current and predicted human capability and so on? What type of world can we expect from such a discovery?

Jaques and Cason address the ethical issues surrounding the ability to be measure each and everybody's human capability in the preface to their book *Human Capability*, and on balance held that there is so much judgement of human capability based on spurious and erroneous

notions such as race, gender, agism etc. taken place all the time anyway, that the introduction of a "*reliable* and *valid* [would] be unequivocally on the side of the social good."[313]

7.3 Jaques and Sensemaking

Mokyr, Jarred Diamond, Landes and many others have all investigated the reasons why some civilizations rise to great heights and then stutter and collapse, why the western nations have so much "cargo", etc. If we start with Maturana, and follow with Jaques, it can be said the civilizations succeed when their systems of organization reflect the way in which the world around them operates, and start to fail when they allow the unicorns of their language suffused world to override the logic of the same environment they occupy. In short, do we now choose science or language? Is it a choice of science or language?

Tsoukas discusses the tension between the Logico-scientifico mode and the Narrative mode in his book *Complex Knowledge.*[314] Tsoukas presents Bruner's[315] description of the following differences between the two approaches as a departure point:

Table 10.1: Comparison of Bruner's two modes of thought

	Logico-scientific mode	Narrative mode
Objective	Truth	Verisimilitude
Central problem	To know truth	To endow experience with meaning
Strategy	Empirical discovery guided by reasoned hypothesis	Universal understanding grounded in personal experience
Method	Sound argument Tight analysis Reason Aristotelian logic Proof	Good story Inspiring account Association Aesthetics Intuition
Key characteristics	Top-down Theory-driven Categorical General Abstract Decontextualized Ahistorical Non-contradictory Consistent	Bottom-up Meaning-centred Experiential Particular Concrete Context-sensitive Historical Contradictory Paradoxical, ironic

From the preceding chapters, it is not difficult to determine that Jaques can very definitely be positioned as operating in the Logico-scientific mode, whereas Weick, by his own admission

[313] (Jaques, Elliott, and Cason, Kathryn, 1994), p xi.

[314] (Tsoukas, 2005), chapter 10, Complex Thinking, Complex Practice: The Case for a Narrative Approach to Organizational Complexity, Haridimos Tsoukas and Mary Jo Hatch

[315] (Tsoukas, 2005), page 233.

of "joining an on-going conversation," [316] is definitely operating in the narrative mode. He reinforces the contention that the complexity that surrounds us is so great that it is too difficult to describe it in the narrow Logico-scientific frame work[317]. This view leads to the proposition that the Narrative framework is the better option. Jaques has strong views on what he perceives as the short comings of the narrative mode; these were expressed in his working paper *Alchemy & Management Science*[318].

Does this mean that the two positions are un-reconcilable? Perhaps we can answer that question by quoting the following from Jaques himself:

> "The making of choices and decisions is connected with *uncertainty.* … The factors and possibilities entering into human choice situations are always infinite. The reasons are infinite, regardless of whether the options are finitely limited, as in, for example, gambling on the toss of a coin, or infinitely open, as in most choice situations with respect to action in real life in solving a problem or in satisfying a need. There are always the choices that have been made previously in similar (but never identical) situations; there are all the reasons which have never been thought up before; then there is the possibility of postponement; or of giving up and trying something else; and finally there are all the conflicting desires, aspirations, expectations, hopes, fears, prejudices, influences from others-some conscious and some unconscious. It is out of this amalgam of the formulated, the unformulated, and the unconscious that we somehow decide what to do, sometimes quickly and sometimes with hesitation, sometimes with a confident feeling of a high probability of a satisfactory outcome and sometimes with a pessimistic feeling of low probability. It is because of this inevitable uncertainty and play of unconscious factors that some modern decision theory operates on the basis of establishing probability judgments and of helping decision-makers to formulate their view of the degree of unceIiainty of their judgment in terms of their sensed probability of a particular outcome.
>
> A judgment of probability is a rational and not a random process; it is an unconscious process made within a conscious context. The context and the outcome of the unconscious judging process usually become conscious, but not the process itself.

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[316] (Weick, 1995), page xi.

[317] Ibid, page xii, "conversion of knowledge of acquaintance into knowledge about (Ryle, 1949) is a risky exercise".

[318] (Jaques, Working Paper # 1003: Alchemy & Management Science, 1998)

> Conscious knowledge can help to limit the field of choice within which we apply our unconscious rationality. It provides context. It also provides a logico-critical context for the evaluation of progress toward solutions as well as of final solutions, helping to eliminate errors. But it cannot make decisions.
>
> To bring certainty into decision-making is a contradiction in terms."[319]

Once again we are confronted with the issue of process as opposed to product. Just because the process is ineffably complex, it does not mean that it does not contain countable entities with measurable attributes.

Where does this then leave Jaques' sensemaking model in terms of the main stream sensemaking research? The answer to that lies at the very beginning on page 2, where the bibliography compiled by Kenneth Cradock[320] listed not only all the research efforts that have cited Jaques and his work over the years, but also all the various academic disciplines addressed in these publications that ranged from Economics, Management (and Organizations), Labor Economics, Operations/ Decision Analysis/ Information Systems, Psychology, Sociology and a variety of other miscellaneous disciplines. In this way his ideas will continue to be incorporated into the mainstream research initiatives, like yeast that imperceptibly spreads through the whole.

As for Jaquian determinism, even though it is fundamentally sound, it is too brutally contrary to the current politically correct, deterministic consensus prevalent in the West. The concept of the logic located in the language may be a bridge too far to accept in exchange for the luxury found in the patience of paper: it doesn't mind what you write on it.

7.4 Further considerations

Does this mean that Jaques should be ignored? On the contrary, his research may have direct bearing on the solutions to a number of problems the world is facing today.

In the developed world, the tendency to extend the retirement age is increasing, for partially the wrong reasons, i.e. the considerations are financial as opposed to optimal utilization of human capability, whereas in the developing world such as SA the great emphasis is at the opposite end of the scale, i.e. on the creation of jobs for the burgeoning young population. Jaques' theories are applicable in both. For the developed world the retirement of their human

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[319] (Jaques, The Form of Time, , 1982), p 71 – 72.

[320] (Craddock, 2009)

resources when the same are at the peak of their human capability is actually an act of gross mismanagement. Jaques has written about this.

For the developing world, if you take SA as an example, 42% of the population is below the age of 19. The greater majority of the population thus occupies the lower level of Jaques' measure of human capability and thus the jobs that need to be created must be for the equivalent level in terms of time-span and logical capability. Our societies and economies have to be structured according to the structure of the environment we occupy, and the population demographics inform this environment to a certain extent. Would the application of Jaques theories make sense in the African context?

Finally, in this world where the population has reached seven billion and the young far outnumber the old, the temptation to set the old aside in pursuit of new ways may become overwhelming. We may do well to be reminded of the ancient commandment, "Honour your father and mother"—which is the first commandment with a promise— "so that it may go well with you and that you may enjoy long life on the earth."[321] Jaques has explained why.

[321] Ephesians 6:3 Deut. 5:16

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Appendix A

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Appendix B

Elliott Jaques' Research 1947 - Present

BA, Honours Science (University of Toronto)

PhD, Social Relations (Harvard) MD, Johns Hopkins Medical School Psychoanalyst, British PsychoAnalytical Society

1932

Psychology
- Capability
- Values
- Interpersonal relationships

Sociology
- Structure
- Processes
- Practices

Economics
- Compensation
- Labor Economics
- Pricing

... lies the foundation that led to his unique understanding of the inter-relationships between Psychology, Sociology and Economics:

1947

~

In Applied Research

~

culminating in the growth and development of ...

In the Service of Management Development

Present

A General Theory of Human Behavior and Social Institutions

21st Century

Appendix C

Characterization of Levels and Dualities[322]

Level (1)

Characterized by the ambiguity of self and *umwelt* growing out of each other (Ch. 7) from which all further ambiguities emerge, I t is the level of the ambiguity- of the selfexplanatory gesture, 'choice' is made in direct action. The duality is on the one hand that of the separation inherent in that attention is directed towards one of many possibilities, and on the other hand of the bringing together inherent in the taking or leaving of an object.

Level (2)

Duality 1. On the one hand the individual is related to another individual through the object and on the other hand the individual is related to the object through another individual. In this the self-explanatory gesture becomes explicated in the ambiguity of meaning and conventional word. Choice-making is now made indirectly, i.e. through another person. Thus the choice is made in an extended context (duality 2) ; extended in that the second person is now explicit and another object introduced.

Duality 2. This is the ambiguity of social relations and common task. The former expresses the am biguity of meaning and word in separating them and the latter the ambiguity of meaning and word in bringing them together. Meaning and word are separate in the first case in the sense that an individual communicates that of which the second individual has no experience. In the second case meaning and word are brought together in that in the common task there is a mu tual modification of individuals' experiences.

Level (3)

Dualities 1 and 2. The ambiguity of social relation and common task becomes explicated in the ambiguity of class and that of defining property in a further extension of context involving the introduction of another individual. In the former, duality 1, an object is related to another object through an individual. This is the ambiguity of the association of object and meaning in denoting (different as objects/similar with respect to meaning). In the latter, duality 2, an object is related to an individual through another object. This is the ambiguity of the associations of attribute and word in connoting (similar in defining property/differe~t with respect to use).

Duality 3. With the introduction of the other individual at this level order is introduced. This individual *is* common to two pairs of individuals, each pair being related by an object·. On the one hand the other two individuals are related to each other through him and on the other hand~ the common individual is related to the other two through the objects. This is the ambiguity of classifying and group formed (separation and bringing together of class and defining property. Intuitively non-con tradiction and excluded middle).

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[322] (Jaques, Elliott, Gibson, R O and Isaac, D J, 1978), pages 158 – 160.

Level (4)

Dualities 1 and 2. With extension of context in the introduction of a further object the ambiguity of classifying and group formed is explicated in the ambiguity of empirical generalization, in the sense of a class of ordered pairs. As a class of pairs there is the ambiguity (duality 1) of denotation and denoting (class/association of object and meaning). As ordered pairs, order being a new defining property, there is the ambiguity (duality 2) of abstraction and connoting (property as an attribute of something/attribution of the property).

Duality 3 is a higher duality having, as its aspects, duality 1 and duality 2. Now the or/and ambiguity ofleve! (2) becomes fully explicit in the ambiguity of denotation and abstraction (word for a class/meaning of a property).

Duality 4. The objects hitherto introduced as members of a class were the same as objects. The introduction of the further object at this level makes possible the ordering of pairs of objects. Whereas in the introduction of the further individual at the previous level, an individual fulfils the ordering role (final cause), at this level the further object fulfils this role (effective cause). This is the ambiguity of induction and deduction, duality 4 (relationship in the sense of pairs of individuals related by objects/polarity in the sense of pairs of objects as related by individuals).

Level (5)

Duality 1. One aspect of induction is systematized in 'psychological control' in the sense of objects as related through other objects, with the extension of context to external objects as such. The ambiguity of object and meaning in denoting is now fully explicit.

Duality 2. The other aspect of induction is systematized in 'conforming individual' in the sense of objects as relating other objects. The ambiguity of denoting and denotation is now fully explicit.

Duality 3. One aspect of deduction is explicated in 'differentiation of social classes' in the sense of individuals as related through other individuals. The ambiguity of attribution and word is now fully explicit.

Duality 4. The other aspect of deduction is explicated in 'economic function' in the sense of individuals as relating others. The ambiguity of abstraction and connoting is now fully explicit in the ordered relations of production.

Duality 5. Dualities one to four are possible only in that, with extension of context to external objects as such the individual as such has become fully realized in interrelated individuals.

The ambiguity of induction and deduction has given way to the quantitative distinction between the universal and the particularin a universe of discourse (statistical dispersion/average).

Through this last duality the theoretical work is linked back to the experimental data which originally served as its basis.

Appendix D

The Phoenix Checklist.[323]

The Problem

- Why is it necessary to solve the problem?
- What benefits would be received by solving the problem?
- What is the unknown?
- What is it you don't yet understand?
- What is the information you have?
- What isn't the problem?
- Is the information sufficient? Or is it insufficient? Or redundant? Or contradictory?
- Where are the boundaries of the problem? Can you separate the various parts of the problem? Can you write them down? What are the relationships of the parts of the problem?
- What are the constants (things that can't be changed) of the problem?
- Have you seen this problem before?
- Have you seen this problem in a slightly different form?
- Do you know a related problem?
- Try to think of a familiar problem having the same or a similar unknown?
- Suppose you find a problem related to yours that has already been solved. Can you use it? Can you use its method?
- Can you restate your problem? How many different ways can you restate it? More general? More specific? Can the rules be changed?
- What are the best, worst, and most probable cases you can imagine?

The Plan

- Can you solve the whole problem? Part of the problem?
- What would you like the resolution to be? Can you picture it?
- How much of the unknown can you determine?
- Can you derive something useful from the information you have?
- Have you used all the information?
- Have you taken into account all essential notions in the problem?
- Can you separate the steps in the problem-solving process? Can you determine the correctness of each step?
- What creative thinking techniques can use to generate ideas? How many different techniques?
- Can you see the result? How many different kinds of results can you see?

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[323] Reference 261on page 84.

- How many different ways have you tried to solve the problem?
- Can you intuit the problem? Can you check the result?
- What should be done? How should it be done?
- Where should it be done?
- When should it be done?
- Who should do it?
- What you need to do at this time?
- Who will be responsible for what?
- Can you use this problem to solve some other problem?
- What is the unique set of qualities that makes this problem different from another?
- What milestones can best mark your progress?
- How will you know when you are successful?